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Subject Omega Revised HHRA Report Part 1 - Report

History: This message has been forwarded.

Chris - the revised Risk Assessment Report is attached as a pdf file. Appendices will follow shortly via separate e-mails.

Regards,

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<<HHRA Report_RevAug07.pdf>> HHRA Report_RevAug07.pdf

Revised Draft
Human Health Risk Assessment for On-Site Soils

Omega Chemical Superfund Site
Whittier, California

August 6, 2007

Submitted to:

U.S. Environmental Protection Agency
Region IX

Prepared for:

Omega Chemical Site
PRP Organized Group

Prepared by:

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Project No. 10500-37240-T2.0SS.RISK

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Executive Summary

This risk assessment presents an evaluation of potential human health risks and hazards associated with exposure to residual soil and groundwater contamination at the former Omega Chemical site (the Site). The Site is located at 12504/12512 East Whittier Boulevard (Figure ES-1). This Human Health Risk Assessment (HHRA) has been prepared in accordance with Task 2 of the Statement of Work in Consent Decree No. 00-12471 between the United States Environmental Protection Agency (USEPA) and the Omega Chemical Site PRP Organized Group (OPOG). The Consent Decree was lodged on November 24, 2000 and entered into the US District Court on February 28, 2001. This HHRA is consistent with the final On-site Soils Remedial Investigation/Feasibility Study Work Plan dated September 29, 2003.

Because the Site is located in an urban area that has been developed for decades, provides no suitable habitat, and contaminated subsurface soils are covered with buildings, asphalt, or concrete, ecological impacts from the facility are not expected and are not evaluated in this report. California Environmental Protection Agency (CalEPA) will be performing an evaluation of habitat and ecological receptors in a separate report.

ES.1 Approach

This HHRA follows risk assessment guidance from United States Environmental Protection Agency (USEPA) and with accommodations for consistency with similar guidance from CalEPA as necessary.

The following tasks were performed as part of this risk assessment:

- Examined the history of the Omega Chemical site in Whittier, CA, and identified types of chemicals used and likely release mechanisms for these chemicals to enter the environment
- Evaluated data collected to characterize the site and existing contamination and used the most recent of these data to select chemicals of potential concern (COPCs) and to calculate exposure point concentrations
- Analyzed the potential for exposure to COPCs at the site though an evaluation of people that might be exposed, exposure pathways that might result in significant contact between these people and COPCs, and identification of exposure parameters appropriate for quantifying exposure resulting from this contact.
- Identified appropriate toxicity criteria for site COPCs
- Estimated risk to current and potential future receptors (people) that might contact contamination

- Evaluated uncertainties in data, exposure, toxicity and risk characterization aspects of the risk assessment
- Calculated health-based remediation goals (HBRGs) for use in remediation decisions for the site

ES.2 Analytical Data

Data used in the HHRA were obtained from recent sampling events conducted by CDM. During the RI, samples were collected from surface soils, subsurface soils, soil gas, indoor air, and ambient air. Sample locations are shown in Figures ES-2 and ES-2b and analytical summary tables for all samples collected during the RI are provided in the RI report. Selection of data used to support quantitative evaluation is based on quality, quantity, comparability (e.g., similar detection limits), and representativeness of data for current site conditions and potential exposures at the site. These data are then used in selection of COPCs and in estimation of exposure point concentrations used in the calculation of possible chronic daily intake. A more extensive discussion of data quality is provided in the pre-final On-Site Soils RI Report, which was submitted on June 20, 2007 (CDM, 2007).

ES.3 Exposure Pathways

Potentially exposed populations evaluated in the HHRA are future on-site residents, current and future on-site and off-site indoor industrial workers, future on-site outdoor industrial workers, and a future on-site construction worker Currently, no plans exist for residential development at the Site, and the Site location suggests that residential development in areas adjacent to the Site is unlikely. The City intends to allow redevelopment that consists of commercial and retail uses with the construction of multi-level buildings. Specifically, City representatives have stated that it is unlikely that the Omega property will be redeveloped for residential uses (Adams, 2007). Therefore, residential use of the site is not expected to occur in the future and, residential exposures are not significant risk issues. However, quantitative analysis of future residential exposures is provided to provide additional information to the risk manager. Section 3 provides a more detailed discussion of current and reasonable future land uses of the site.

The SCEM for soils at the Omega Site (Figure ES-3) includes theoretically feasible exposures and provides a basis for discussing the likelihood and importance of potential exposure pathways at the site. As illustrated in the SCEM, potential exposure pathways include:

- Oral/Dermal Contact with Surface Soil and Inhalation of Fugitive Dust - Current Industrial Worker
- Inhalation of Indoor Air - Current Industrial Worker
- Inhalation of Ambient Air - Current Industrial Worker

- Oral/Dermal Contact with Regraded Surface/Subsurface Soil and Inhalation of Fugitive Dust – Future Residents, Future Industrial Indoor and Outdoor Workers, Future Construction Workers

- Inhalation of Indoor Air from Soil Gas – Future Residents and Future Industrial Indoor Workers

- Inhalation of Ambient Air from Soil Gas – Future Residents and Future Industrial Indoor Workers, Future Construction Workers, and Future Industrial Outdoor Workers

Currently, groundwater underlying the Site and in the immediate vicinity is not used for any purpose. Use for potable purposes within this area is also unlikely for the future due to the presence of high concentrations of total dissolved solids (TDS). TDS concentrations in groundwater samples from 2004 to 2006 ranged from 630 to 1,700 milligrams per liter (mg/L). The USEPA secondary standard for TDS in drinking water is 500 mg/L while the CalEPA maximum contaminant level (MCL) for drinking water ranges from 500 mg/L (recommended) to 1,000 mg/L (upper) with a short-term concentration of 1,500 mg/L. Use of groundwater at and downgradient of the site will be addressed in a separate report, and is not included in this risk assessment. However, risks from contaminated groundwater could theoretically result from volatilization of groundwater contaminants into ambient and indoor air this possibility is highly unlikely due to the 30-foot clay layer boundary above the water table.

ES.4 Toxicity Assessment

The purpose of a toxicity assessment is to review and summarize available information on the potential for each COPC to cause adverse effects in exposed individuals. Risk characterization combines exposure information with toxicological criteria to estimate carcinogenic risks and noncarcinogenic hazards. Potential cancer risks and potential non-cancer hazards are separately calculated.

Cancer risks are estimated by multiplying exposure estimates for carcinogenic chemicals by corresponding cancer slope factors. The result is a risk estimate expressed as the odds of developing cancer. Commonly, risks (or odds) of developing cancer of one to 100 in one million (1×10^{-6} to 1×10^{-4}) or less are considered to fall within a potentially acceptable range, although decisions on the need for remediation or mitigation are made on a site-by-site basis. Lower risks are typically considered de minimis, while higher risks are often deemed unacceptable (EPA, 1992). In such instances, mitigation of risks may be considered necessary.

Chronic non-cancer hazard indices are calculated by dividing exposure estimates by reference doses. Reference doses are estimates of highest exposure levels that would not cause adverse health effects even if exposures continue over a lifetime. The ratio of exposure to reference dose is termed the hazard quotient (HQ). A HQ greater than one indicates an exposure greater than that considered safe. Impacts of exposure to

multiple chemicals are accounted for by adding estimated HQs for non-carcinogenic chemicals that affect the same target organ or tissue in the body. Addition of HQs for COPCs that produce effects in similar organs and tissues results in a HI that reflects possible cumulative hazards.

ES.5 Risk Characterization

The risk assessment provides quantitative estimates of cancer risk and non-cancer hazard for people that might be exposed to exposure to residual soil and groundwater contamination.

ES.5.1 Cancer Risk

Total cancer risk estimates for current commercial/industrial worker on the Site parcel (Three Kings Construction CTE, 2E-5 to 9E-5 and RME, 4E-5 to 1E-4; Star City Auto Body CTE, 3E-5 to 6E-5 and RME, 4E-5 to 9E-5) are above the point of departure of one in one million but within the EPA risk range (Table ES-1). Cancer risks for the industrial/commercial worker are primarily attributable to inhalation of indoor air. Figure ES-4 shows the cancer risks due to inhalation of indoor air for the different buildings. Inhalation of benzene accounts for 38 (Star City) to 46 (Three Kings) percent of the cancer risk. Onsite, sources at Star Auto Body and/or 3 Kings Construction could be responsible for some or all of the benzene detected in indoor air. Inhalation of methylene chloride accounts for 38 percent of the cancer risk for commercial/industrial workers at Three Kings, while inhalation of PCE accounts for 50 percent of the risk at Star City Auto Body (Figure ES-5).

For the other buildings, cancer risks were assessed only for the inhalation of vapors intruding into indoor air. Estimated Inhalation cancer risks for these parcels were similar to, or lower than, those for the Site parcel, except for the West Parcel – Terrapave. All inhalation cancer risks were above the point of departure of one in one million but within the EPA risk range.

Total cancer risk estimates for future commercial/industrial indoor worker based on data from All Parcels (CTE, 9E-6 to 3E-4 and RME, 1E-5 to 5E-4) are above the EPA risk range (Table ES-2; Figure ES-6). Total cancer risk estimates for future commercial/industrial outdoor worker based on data from All Parcels (CTE, 1E-5 to 7E-5 and RME, 1E-5 to 9E-5) are above the point of departure of one in one million but within the EPA risk range. Cancer risks for the future industrial/commercial indoor worker are primarily attributable to inhalation of indoor air. PCE in soil gas accounts for 90 percent of the total inhalation risk.

Total cancer risk estimates for the future construction worker (CTE, 4E-7 to 2E-5 and RME, 3E-06 to 1E-4) on the Site parcel; on the Others Parcels (CTE, 3E-7 to 2E-5 and RME, 1E-06 to 1E-4); and on All Parcels (CTE, 4E-7 to 1E-5 and RME, 2E-06 to 1E-4) are above the point of departure of one in one million but within the EPA risk range. Cancer risks for construction workers are primarily attributable to inhalation of ambient air. PCE in soil gas accounts for 73 to 81 percent of the total inhalation risk.

Total cancer risk estimates for future residents (adult, 5E-5 to 3E-3; adult+child, 8E-5 to 3E-3; and child, 4E-5 to 1E-3) on the Site parcel and on the Others Parcels (adult, 2E-5 to 4E-3; adult+child, 4E-5 to 5E-3; and child, 3E-5 to 2E-3) are above the EPA risk range(Figure ES-7). Cancer risks for residents are primarily attributable to inhalation of indoor air. Inhalation of PCE in soil gas accounts for 90 to 95 percent of the total inhalation risk.

ES.5.2 Chronic Non-Cancer Hazards

Chronic non-cancer hazards for the current commercial/industrial worker (Three Kings CTE, 0.4 to 1.2 and RME, 0.6 to 2; Star City Auto CTE, 0.5 to 5.1 and RME, 0.8 to 8) are above the threshold of 1. HIs for the current commercial/industrial worker are primarily attributable to inhalation of indoor air (Figure ES-8). HIs for the current commercial/industrial worker on the Site parcel at the Three Kings building are attributable to inhalation exposure to toluene (18 percent), m,p-xylenes (27 percent), methylene chloride (21 percent), PCE (12 percent), and benzene (12 percent).

Inhalation HIs for the five parcels are summarized as follows. HIs for the north parcel (Medlin and Sons, CTE, 0.05 to 0.4 and RME, 0.1 to 1; Medlin and Sons North, CTE, 0.05 and RME, 0.08) are primarily attributable to exposure to acetone (55 percent) with a lesser contribution from PCE (32 percent). HIs for the west parcel (TerraPave, CTE, 0.5 to 1.28 and RME, 0.7 to 1.8) are primarily attributable to exposure to PCE (90 percent). HIs for the south parcel – Bishop (CTE, 0.1 to 0.4 and RME, 0.2 to 0.6) are primarily attributable to exposure to PCE (76 percent) with a lesser contribution from 1,1-DCE (6 percent). HIs for the south parcel – LA Carts (CTE, 0.06 to 0.8 and RME, 0.1 to 1.3) are primarily attributable to exposure to toluene (74 percent) with a lesser contribution from acetone (15 percent). HIs for the south parcel – Oncology Care (CTE, 0.09 and RME, 0.14 to 0.15) are primarily attributable to exposure to toluene (20 percent), 1,2-DCA (23 percent), benzene (14 percent) and acetone (11 percent).

Total HIs for future residents (Site Parcel: adult, 0.7 to 30; adult+child 1.4 to 39; and child, 4.1 to 74; Other Parcels: adult, 0.4 to 45; adult+child 1 to 58; and child, 3.4 to 109) are above the target threshold (Figure ES-9). The highest HQs for residents are calculated from data from the Other Parcels and are attributable to inhalation exposure to PCE and 1,1-DCE, which account for 90 and 6 percent of HIs for the adult+child resident and 86 and 8 percent of HIs for the child adult+child resident on the Site Parcel.

Total HIs for future commercial/industrial workers (Indoor: CTE, 0.15 to 4.4 and RME, 0.3 to 7; and Outdoor: CTE, 0.23 to 1 and RME, 0.3 to 1.4) based on data from All Parcels are above the target threshold (Figure ES-10). Inhalation of indoor air is attributable for most of this hazard. Similar to the resident, PCE and 1,1-DCE account for most of the hazard, contributing 84 and 9 percent, respectively.

Total hazard indices for the construction worker (Site Parcel: CTE, 0.13 to 6 and RME, 1.2 to 48; Other Parcels: CTE, 0.09 to 4.5 and RME, 0.9 to 36; and All Parcels: CTE, 0.12 to 4.4 and RME, 1.2 to 35) are also above the target HI of one. Nearly 98 percent of the

hazards for the future construction worker are related to inhalation of ambient air. Hazards are higher on the Site Parcel than on the Other Parcels and than All Parcels combined. Hazards are primarily attributable (74 to 96 percent) to PCE. 1,2-DCA also contributes significantly (9 to 18 percent) to the hazards on the Site Parcel and All Parcels.

ES.6 Conclusions

Important results of the risk assessment that follow from the HHRA can be summarized as follows:

- Field investigations since 2004 provide a recent and complete site characterization. High confidence can be assigned to use of these data to select chemicals of potential concern and to estimate exposure point concentrations.

- Commercial/industrial land use is an appropriate assumption for future site use. The site has been used for such purpose since it was developed from agricultural land in the 1950's. The site is still surrounded by commercial industrial land use, is located on a major arterial, and possesses no characteristics that would suggest that would make it desirable for residential development. In addition, City representatives have stated that it is unlikely that the Omega property will be redeveloped for residential uses (Adams, 2007).

- Among receptors likely to be exposed to site-related contaminants, the highest cancer risks and noncancer hazards are associated with exposure of hypothetical future residents, with risks above the EPA risk range and hazards above the target threshold.

- The pathway that suggests the highest potential for exposure involves intrusion of vapors into indoor air spaces. Inhalation of these vapors indoors results in the highest estimates of potential cancer risk and noncancer hazard.

- No complete exposure pathways exist that involves contact with contaminants in soils and groundwater below the 30-foot clay zone.

- PCE is the primary COPC of concern at the site. For example, inhalation of indoor air suggests potential total inhalation cancer risks for current industrial workers ranging from 8E-6 to 7E-5. Cancer risk associated with inhalation exposure to PCE alone ranges from 5E-7 to 4E-05. Estimated hazards for PCE were relatively low, however. HQs for exposure to indoor air for PCE ranged from 0.01 to 1.6 compared to a total inhalation HIs ranging from 0.05 to 8.

- Potential risks associated with exposure to ambient (urban background) concentrations of VOCs are as high as $3x10^{-5}$ and may account for 12 to essentially 100 percent of total risks estimated for indoor exposures, depending on parcel. LA Carts/Oncology Care may not be affected by site-related VOCs. Incremental

risks that could be associated with vapor intrusion are significantly less than those presented for total risks at the site.

- Ambient air risks for construction workers are within the EPA risk range, while ambient air hazards are above the target threshold primarily attributable to inhalation of PCE in ambient air. These risks are likely to be overestimated given the amount of dilution anticipated for VOCs release to ambient air.

- Hypothetical exposure to contaminants in soil is unlikely to occur, since soil is currently covered with buildings, asphalt, and concrete and such cover is likely to remain even if the site is redeveloped for other commercial/industrial purposes in the future. Further, volatile COPCs, in particular PCE, acetone, and toluene, will not persist in non-volatile form in soils exposed during excavation, and direct contact exposures (incidental ingestion and dermal contact) for construction worker exposures via these pathways are expected to be minimal. These VOCs along with benzo(a)pyrene were associated with the bulk of risks and hazards estimated for direct contact exposure to surface soils.

- Uncertainties in the risk assessment suggest that site-related risks have been adequately characterized to support risk management decisions. In fact, the database is biased toward source/release areas and likely overstates levels of contamination for the site as a whole.

- Site-related risks involving exposure to PCE vapors in indoor air appear to be adequately assessed using available site-specific data.

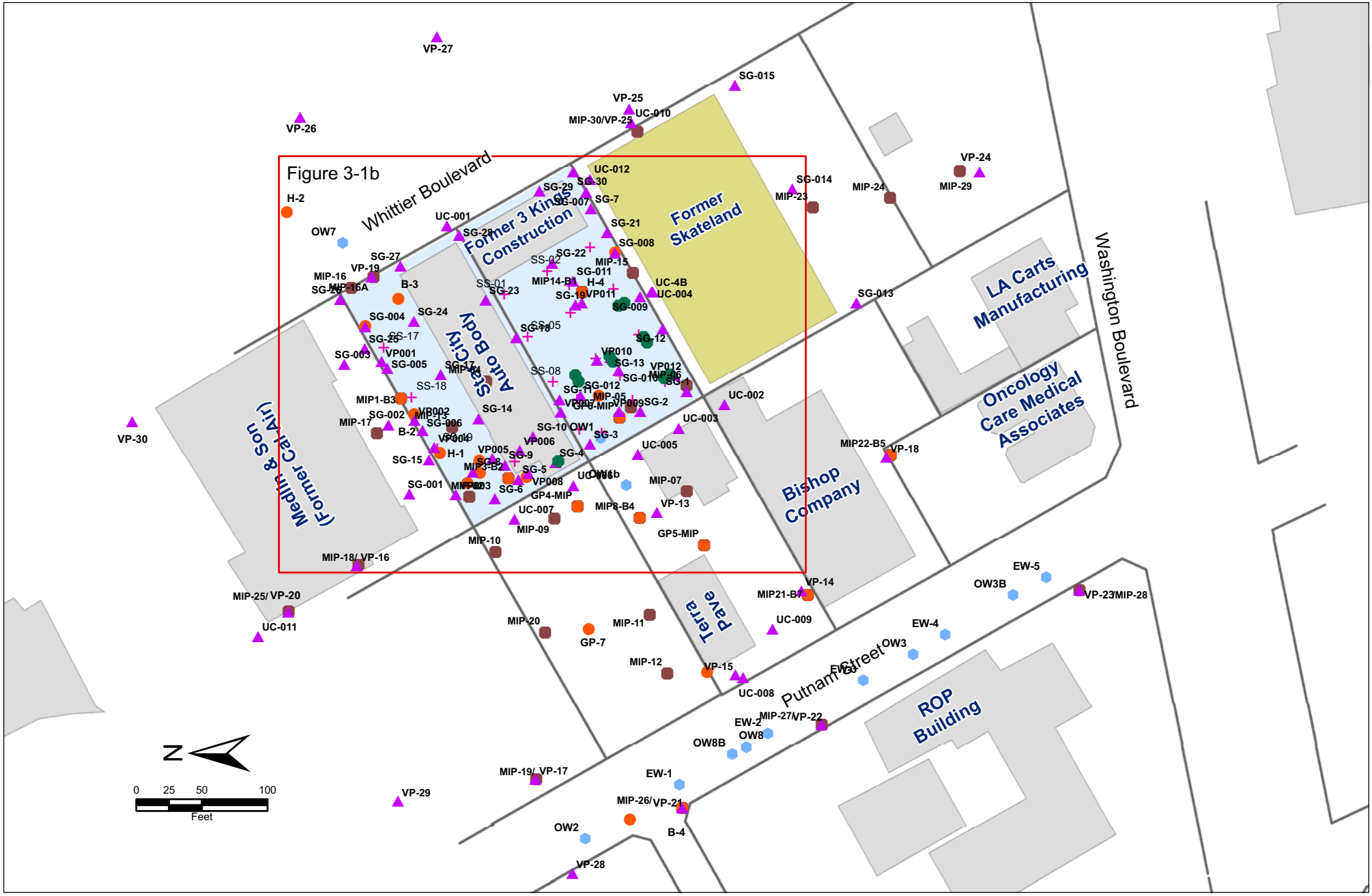
- HBRGs developed for PCE can be used upon approval by EPA with confidence in evaluating remedial alternatives, if the site is deemed to pose an unacceptable risk.

OMEGA CHEMICAL

SITE VICINITY MAP

CDM

FIGURE ES-1



DRAFT

CDM

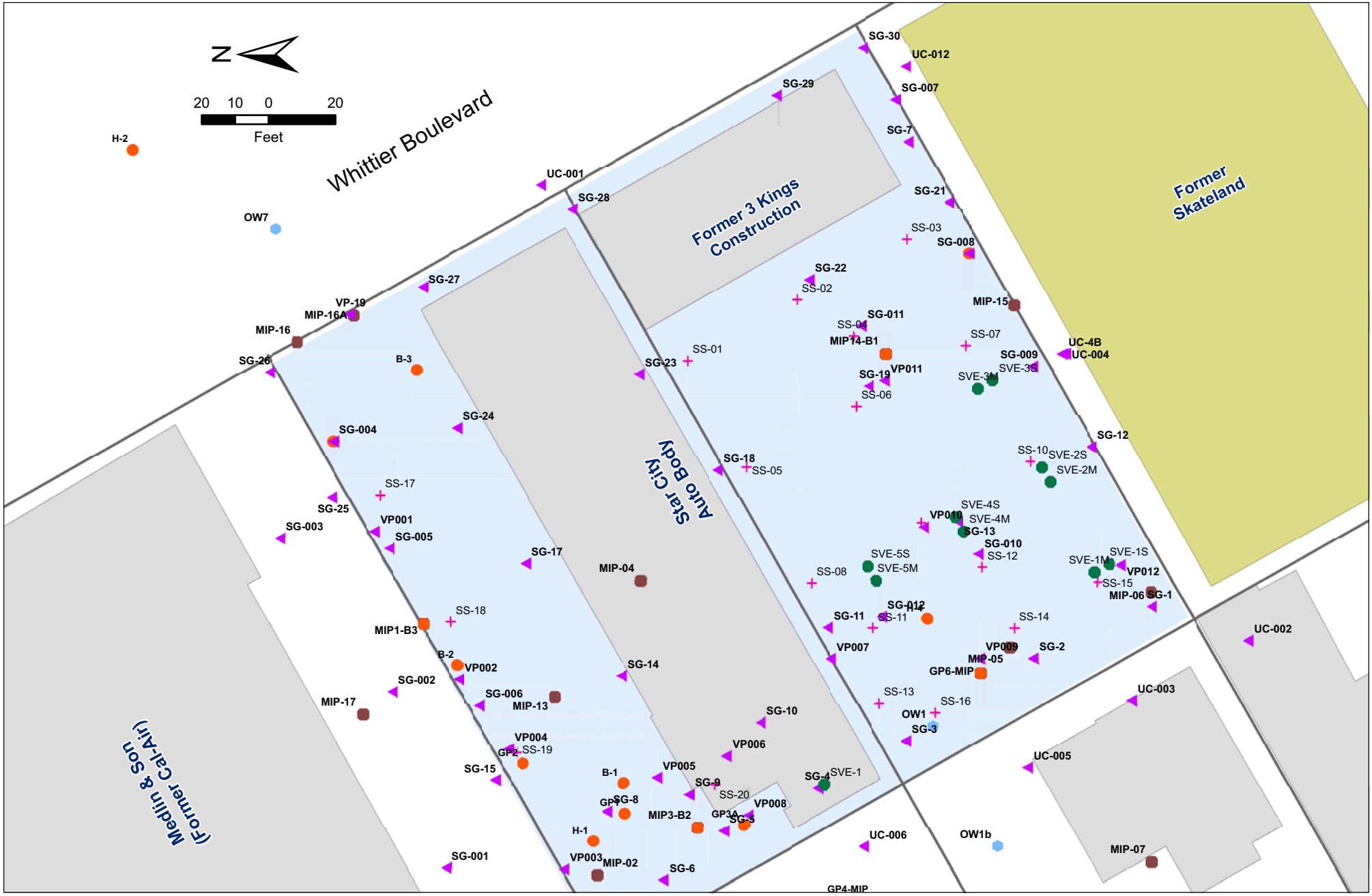
Legend

- Property Boundary
- Former Omega Chemical Property
- Existing Building
- Former Building
- Surface Soil Sample Location
- Subsurface Soil Sample Location
- Soil Vapor Sample Location
- Membrane Interface Probe (MIP)
- SoilVaporExtractionWells
- Groundwater Well Location

Omega Chemical

Sampling Locations

Figure ES-2



DRAFT

Legend

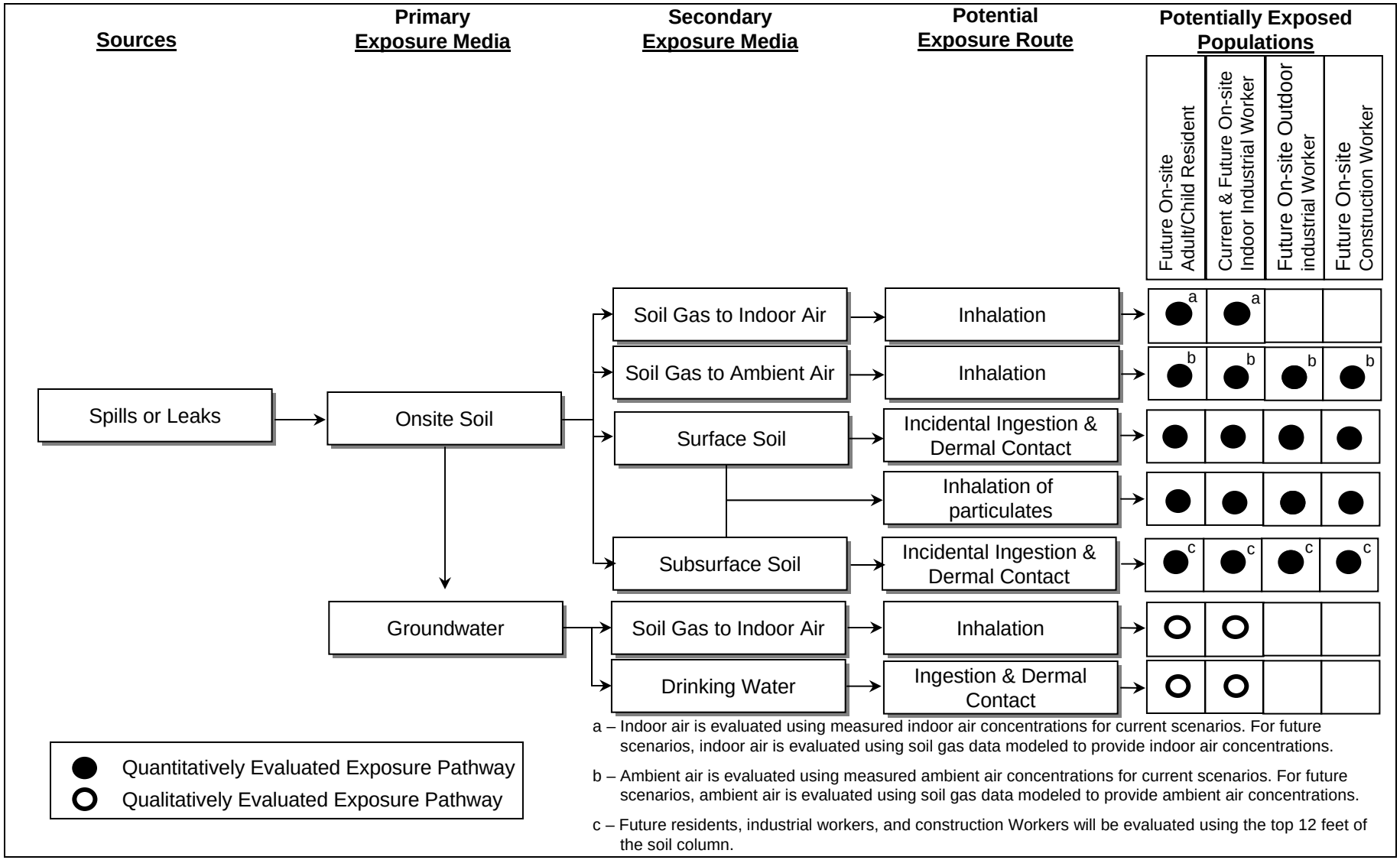
- Property Boundary
- Former Omega Chemical Property
- Existing Building
- Former Building
- Surface Soil Sample Location
- Subsurface Soil Sample Location
- Soil Vapor Sample Location
- Membrane Interface Probe (MIP)
- SoilVaporExtractionWells
- Groundwater Well Location

CDM

Omega Chemical

Sampling Locations (Inset)

Figure ES-2b



CDM

Figure ES-3
Site Conceptual Exposure Model – Omega Chemical Site
Whittier, California

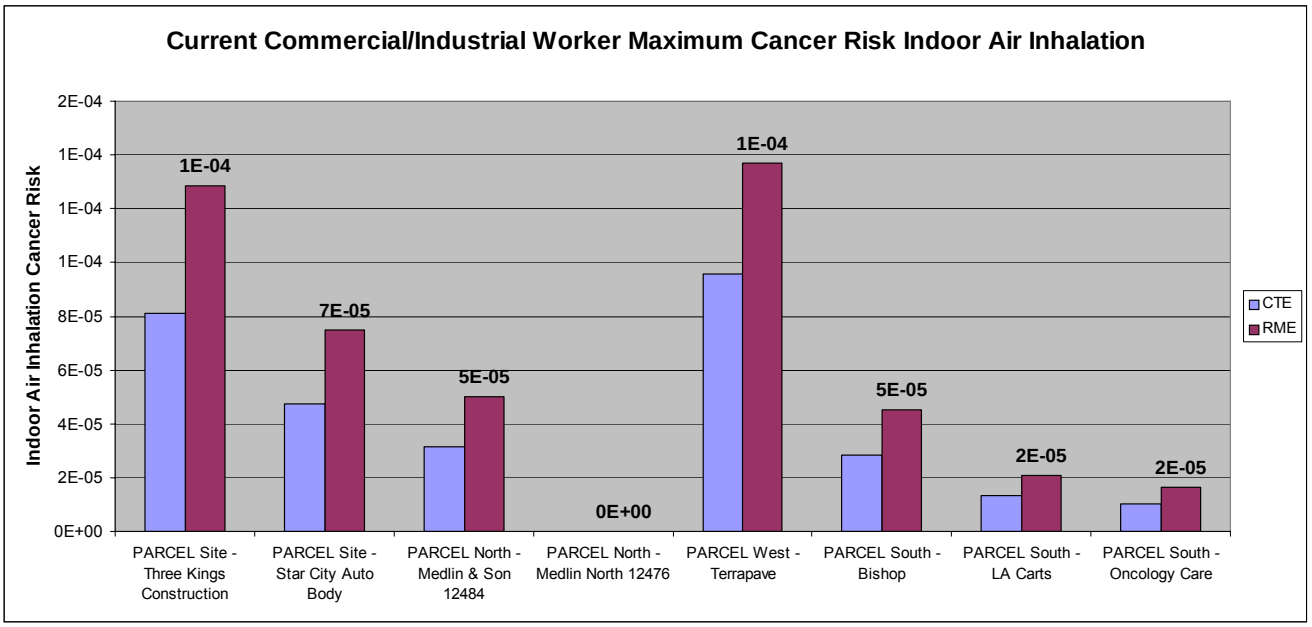
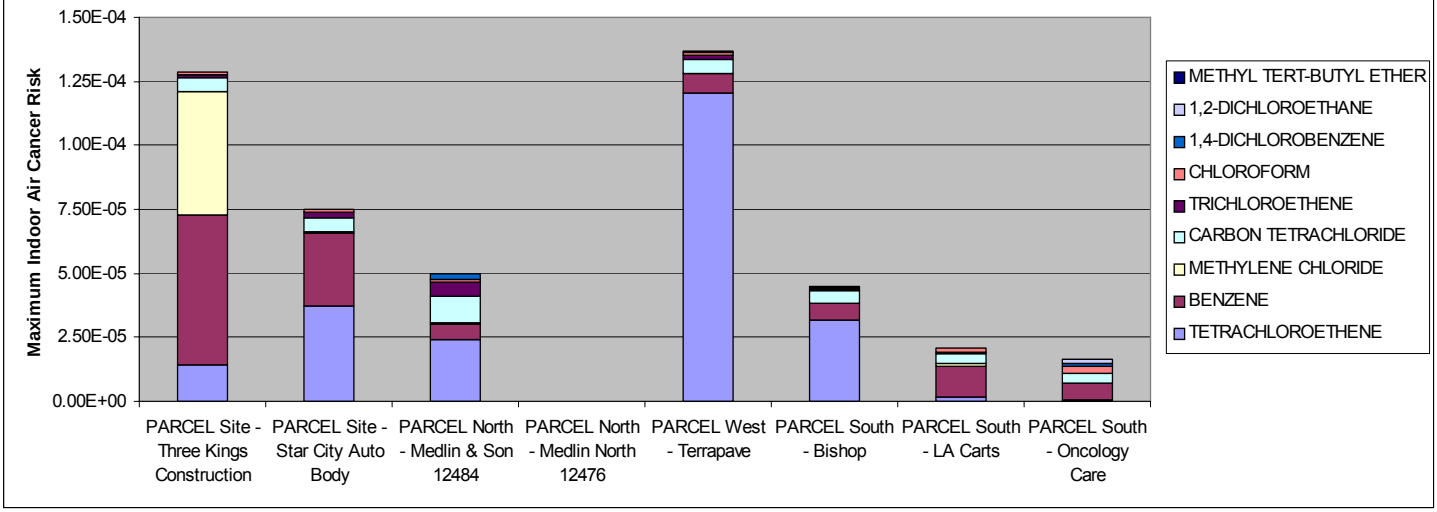
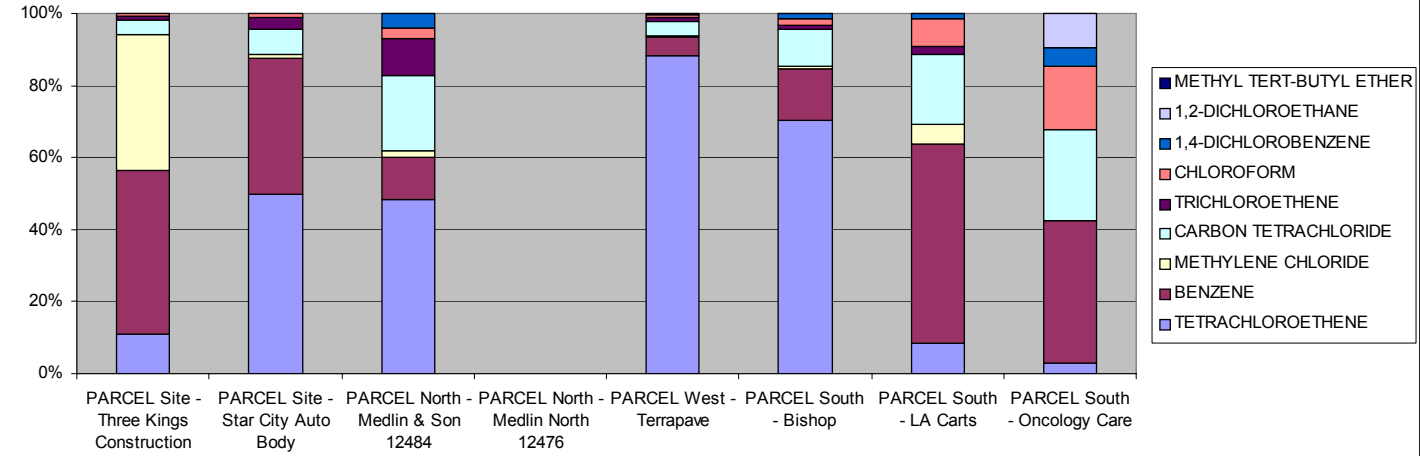


Figure ES-4
Current Commercial/Industrial Worker
Maximum Indoor Air Cancer Risks

Current RME Commercial/Industrial Worker Cancer Risk by Chemical for Indoor Air Inhalation Pathway



Current RME Commercial/Industrial Worker by Chemical Percentage of Total Cancer Risk for Indoor Air Inhalation Pathway



Chemical	RME Commercial Industrial Worker Cancer Risk by Chemical for Indoor Air Inhalation Pathway							
	PARCEL Site - Three Kings Construction	**PARCEL Site - Star City Auto Body**	**PARCEL North - Medlin & Son 12484**	**PARCEL North - Medlin North 12476**	**PARCEL West Terrapave**	**PARCEL South - Bishop**	**PARCEL South - LA Carts**	**PARCEL South - Oncology Care**
1,2-DICHLOROETHANE								9.55%
1,4-DICHLOROBENZENE			4.0%		0.4%	1.5%	1.6%	5.1%
BENZENE	45.5%	37.6%	11.7%		5.4%	14.1%	55.5%	39.4%
CARBON TETRACHLORIDE	4.0%	7.1%	20.8%		3.9%	10.2%	19.7%	25.6%
CHLOROFORM	0.8%	1.1%	2.7%		0.7%	1.7%	7.5%	17.4%
METHYL TERT-BUTYL ETHER						0.1%		
METHYLENE CHLORIDE	37.6%	1.2%	1.9%		0.2%	0.7%	5.2%	
TETRACHLOROETHENE	11.1%	49.8%	48.4%		88.1%	70.5%	8.3%	3.0%
TRICHLOROETHENE	1.0%	3.2%	10.4%		1.2%	1.2%	2.1%	
Other	0.0%	0.0%	0.0%	100.0%	0.0%	0.0%	0.0%	0.0%
TOTAL	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**

Figure ES-5
Current RME Commercial/Industrial Worker Indoor Air Cancer Risks by Chemical

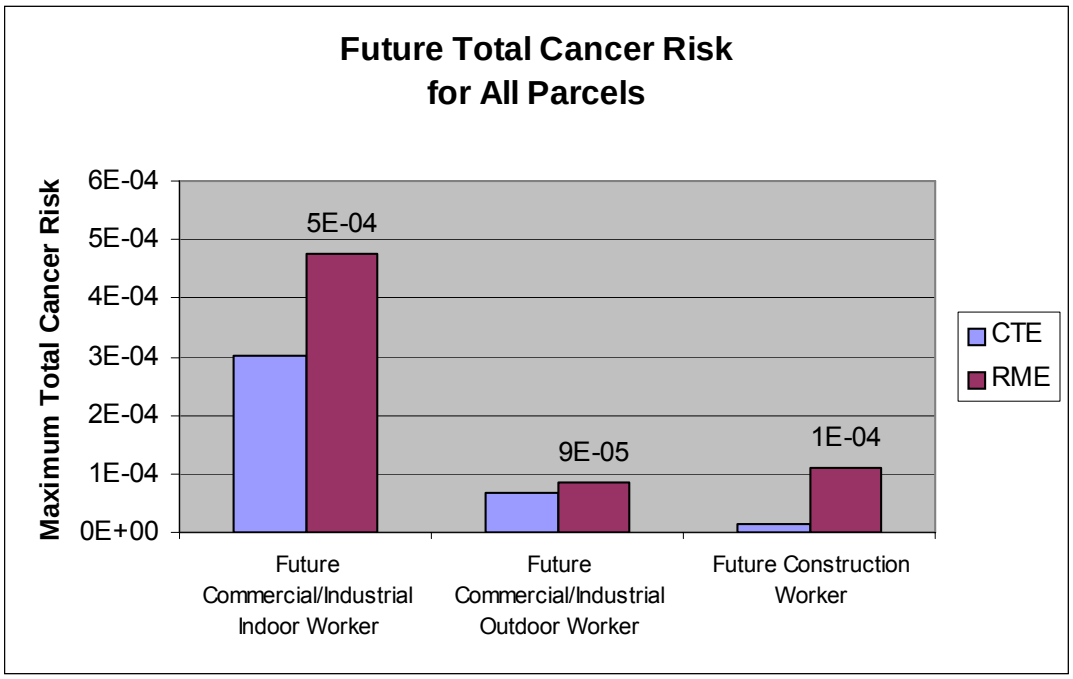


Figure ES-6
Future Commercial/Industrial Workers and Construction Workers
Total Cancer Risks

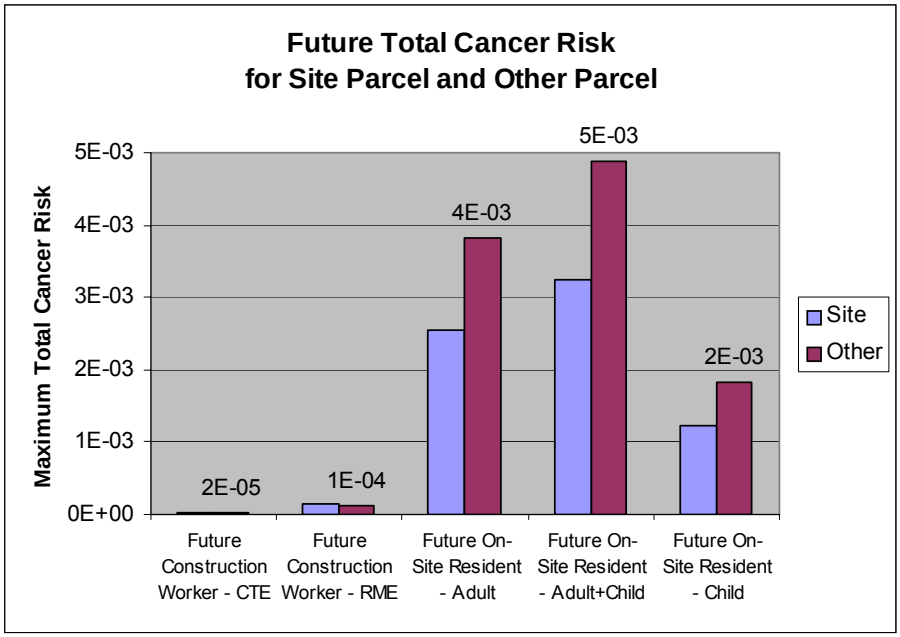


Figure ES-7
Future Residents and Construction Worker
Total Cancer Risks

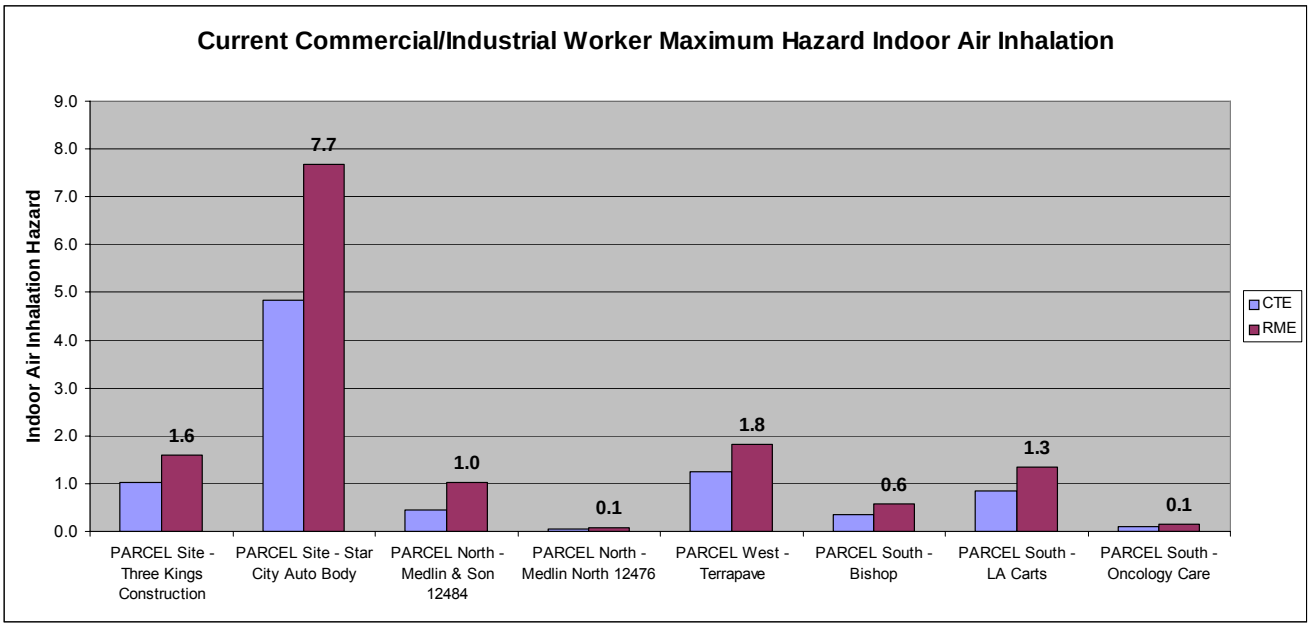


Figure ES-8
Current Commercial/Industrial Worker
Maximum Indoor Air Hazard

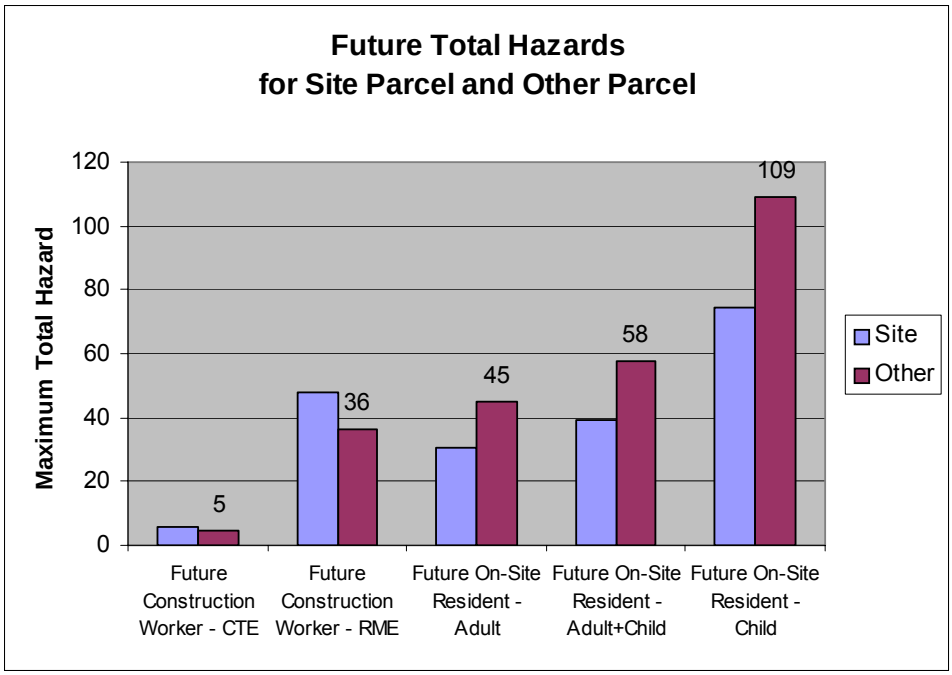


Figure ES-9
Future Residents and Construction Worker
Total Hazard

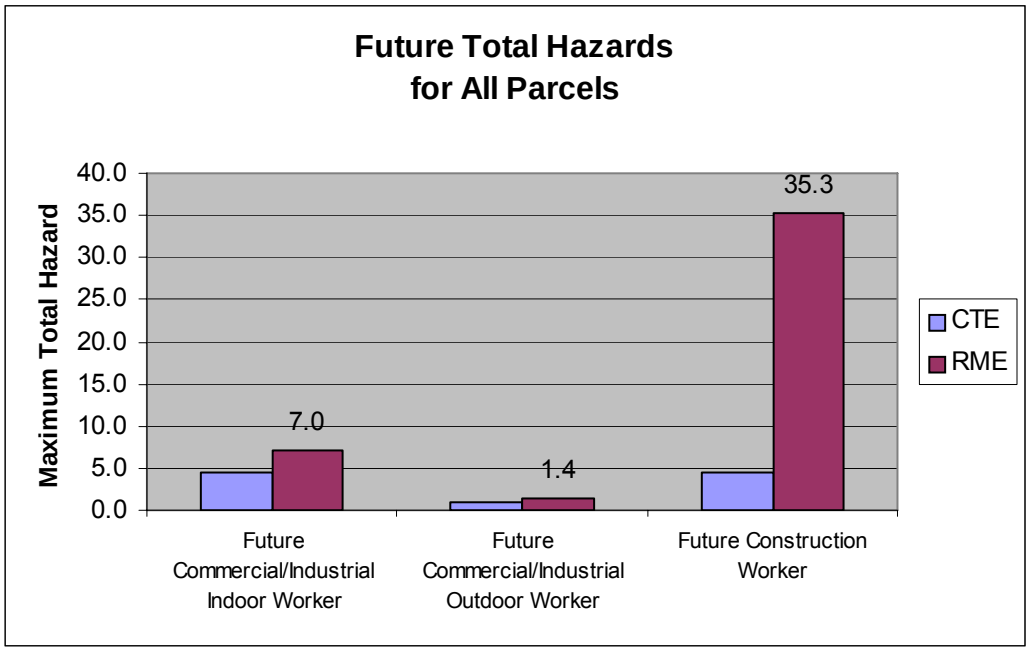


Figure ES-10
Future Commercial/Industrial Workers and Construction Workers
Total Hazard

Table ES-1
Summary of Chronic Cancer Risks and Chronic Non-Cancer Hazards - Current Scenarios

Receptor	Exposure Pathway	PARCEL Site - Three Kings Construction				PARCEL Site - Star City Auto Body				PARCEL North - Medlin & Son 12484				PARCEL North - Medlin North 12476		PARCEL West - Terrapave				PARCEL South - Bishop				PARCEL South - LA Carts				PARCEL South - Oncology Care			
		Total Chronic Cancer Risk		Total Chronic Non-Cancer Hazard		Total Chronic Cancer Risk		Total Chronic Non-Cancer Hazard		Total Chronic Cancer Risk		Total Chronic Non-Cancer Hazard		Total Chronic Cancer Risk	Total Chronic Non-Cancer Hazard	Total Chronic Cancer Risk		Total Chronic Non-Cancer Hazard		Total Chronic Cancer Risk		Total Chronic Non-Cancer Hazard		Total Chronic Cancer Risk		Total Chronic Non-Cancer Hazard		Total Chronic Cancer Risk		Total Chronic Non-Cancer Hazard	
		Minimum	Maximum	Minimum	Maximum	Minimum	Maximum	Minimum	Maximum	Minimum	Maximum	Minimum	Maximum			Minimum	Maximum	Minimum	Maximum	Minimum	Maximum	Minimum	Maximum	Minimum	Maximum	Minimum	Maximum	Minimum	Maximum	Minimum	Maximum
Current Commercial/Industrial worker CTE	**Surface Soil to 2.2 ft bgs** – Oral/Dermal/Inhalation[3]	9.E-06	9.E-06	0.15	0.15	9.E-06	9.E-06	0.15	0.15	NA[2]	NA[2]	NA[2]	NA[2]	NA[2]	NA[2]	NA[2]	NA[2]	NA[2]	NA[2]	NA[2]	NA[2]	NA[2]	NA[2]	NA[2]	NA[2]	NA[2]	NA[2]	NA[2]	NA[2]	NA[2]	NA[2]
	Indoor Air – Inhalation Pathway[1]	*1.E-05*	*8.E-05*	*0.15*	*1.0*	*2.E-05*	*5.E-05*	*0.3*	*4.8*	*8.E-06*	*2.E-05*	*0.05*	*0.4*	*0.E+00*	*0.05*	*4.E-05*	*1.E-04*	*0.5*	*1.2*	*1.E-05*	*3.E-05*	*0.12*	*0.4*	*9.E-06*	*1.E-05*	*0.06*	*0.8*	*1.E-05*	*1.E-05*	*0.09*	*0.09*
	Ambient Air – Inhalation Pathway	*1.E-06*	*1.E-06*	*0.06*	*0.1*	*1.E-06*	*1.E-06*	*0.1*	*0.1*	NA[2]	NA[2]	NA[2]	NA[2]	NA[2]	NA[2]	NA[2]	NA[2]	NA[2]	NA[2]	NA[2]	NA[2]	NA[2]	NA[2]	NA[2]	NA[2]	NA[2]	NA[2]	NA[2]	NA[2]	NA[2]	NA[2]
	TOTAL	**2.E-05**	**9.E-05**	**0.4**	**1.2**	**3.E-05**	**6.E-05**	**0.5**	**5.1**	**8.E-06**	**2.E-05**	**0.05**	**0.4**	**0.E+00**	**0.05**	**4.E-05**	**1.E-04**	**0.5**	**1.2**	**1.E-05**	**3.E-05**	**0.12**	**0.4**	**9.E-06**	**1.E-05**	**0.06**	**0.8**	**1.E-05**	**1.E-05**	**0.09**	**0.09**
Current Commercial/Industrial worker RME	**Surface Soil to 2.2 ft bgs** – Oral/Dermal/Inhalation[3]	1.E-05	1.E-05	0.3	0.3	1.E-05	1.E-05	0.3	0.3	NA[2]	NA[2]	NA[2]	NA[2]	NA[2]	NA[2]	NA[2]	NA[2]	NA[2]	NA[2]	NA[2]	NA[2]	NA[2]	NA[2]	NA[2]	NA[2]	NA[2]	NA[2]	NA[2]	NA[2]	NA[2]	NA[2]
	Indoor Air – Inhalation Pathway[1]	*2.E-05*	*1.E-04*	*0.2*	*1.6*	*3.E-05*	*7.E-05*	*0.4*	*7.7*	*2.E-05*	*5.E-05*	*0.1*	*1.0*	*0.E+00*	*0.08*	*6.E-05*	*1.E-04*	*0.7*	*1.8*	*2.E-05*	*5.E-05*	*0.2*	*0.6*	*1.E-05*	*2.E-05*	*0.10*	*1.3*	*2.E-05*	*2.E-05*	*0.14*	*0.15*
	Ambient Air – Inhalation Pathway	*2.E-06*	*2.E-06*	*0.1*	*0.1*	*2.E-06*	*2.E-06*	*0.1*	*0.1*	NA[2]	NA[2]	NA[2]	NA[2]	NA[2]	NA[2]	NA[2]	NA[2]	NA[2]	NA[2]	NA[2]	NA[2]	NA[2]	NA[2]	NA[2]	NA[2]	NA[2]	NA[2]	NA[2]	NA[2]	NA[2]	NA[2]
	TOTAL	**4.E-05**	**1.E-04**	**0.6**	**2.0**	**4.E-05**	**9.E-05**	**0.8**	**8.0**	**2.E-05**	**5.E-05**	**0.1**	**1.0**	**0.E+00**	**0.08**	**6.E-05**	**1.E-04**	**0.7**	**1.8**	**2.E-05**	**5.E-05**	**0.2**	**0.6**	**1.E-05**	**2.E-05**	**0.10**	**1.3**	**2.E-05**	**2.E-05**	**0.14**	**0.15**

(1) Indoor air inhalation pathway was calculated using measured indoor air data.
(2) Soil and ambient air pathways not calculated separately for the parcels
(3) Surface soil risks and hazards for Three Kings Construction and Star City Auto Body are the same for both buildings because there is only one set of soil data for the site.
(4) Ambient air exposure concentrations calculated from measured ambient air concentrations.

Table ES-2
Summary of Chronic Cancer Risks and Chronic Non-Cancer Hazards - Future Scenarios

Receptor	Exposure Pathway	PARCEL Site - Former Omega Property				Parcels Other than the Former Omega Property				All Parcels			
		Total Chronic Cancer Risk		Total Chronic Non-Cancer Hazard		Total Chronic Cancer Risk		Total Chronic Non-Cancer Hazard		Total Chronic Cancer Risk		Total Chronic Non-Cancer Hazard	
		Minimum	Maximum	Minimum	Maximum	Minimum	Maximum	Minimum	Maximum	Minimum	Maximum	Minimum	Maximum
Future Commercial/Industrial worker Indoor Worker CTE	**Surface and Subsurface Soil to 12 ft bgs** – Oral/Dermal/Inhalation									8.E-06	8.E-06	0.14	0.14
	Indoor Air (Soil gas 5 to 6 Feet bgs) – Inhalation Pathway[1]									8.E-07	3.E-04	0.009	4.2
	Ambient Air (Soil gas 5 to 6 Feet bgs) - Inhalation Pathway									1.E-08	5.E-06	0.0002	0.07
	TOTAL									**9.E-06**	**3.E-04**	**0.15**	**4.4**
Future Commercial/Industrial worker Indoor Worker RME	**Surface and Subsurface Soil to 12 ft bgs** – Oral/Dermal/Inhalation									1.E-05	1.E-05	0.3	0.3
	Indoor Air (Soil gas 5 to 6 Feet bgs) – Inhalation Pathway[1]									1.E-06	5.E-04	0.014	7
	Ambient Air (Soil gas 5 to 6 Feet bgs) - Inhalation Pathway									2.E-08	8.E-06	0.0003	0.1
	TOTAL									**1.E-05**	**5.E-04**	**0.3**	**7.0**
Future Commercial/Industrial worker Outdoor Worker CTE	**Surface and Subsurface Soil to 12 ft bgs** – Oral/Dermal/Inhalation									1.E-05	1.E-05	0.2	0.2
	Ambient Air (Soil gas 5 to 6 Feet bgs) - Inhalation Pathway									2.E-07	6.E-05	0.002	0.8
	TOTAL									**1.E-05**	**7.E-05**	**0.2**	**1.0**
Future Commercial/Industrial worker Outdoor Worker RME	**Surface and Subsurface Soil to 12 ft bgs** – Oral/Dermal/Inhalation									1.E-05	1.E-05	0.3	0.3
	Ambient Air (Soil gas 5 to 6 Feet bgs) - Inhalation Pathway									2.E-07	7.E-05	0.002	1.1
	TOTAL									**1.E-05**	**9.E-05**	**0.3**	**1.4**
Future Construction Worker CTE	**Surface and Subsurface Soil to 12 ft bgs** – Oral /Dermal/Inhalation of Fugitive Dust	2.E-07	2.E-07	0.08	0.08	2.E-07	2.E-07	0.08	0.08	2.E-07	2.E-07	0.08	0.08
	Ambient Air (Soil gas 5 to 12 Feet bgs) - Inhalation Pathway - in Excavation[4]	2.E-07	2.E-05	0.05	5.9	1.E-08	2.E-05	0.010	4.4	2.E-07	1.E-05	0.05	4.3
	TOTAL	**4.E-07**	**2.E-05**	**0.13**	**6.0**	**3.E-07**	**2.E-05**	**0.09**	**4.5**	**4.E-07**	**1.E-05**	**0.12**	**4.4**
Future Construction Worker RME	**Surface and Subsurface Soil to 12 ft bgs** – Oral /Dermal/Inhalation of Fugitive Dust	1.E-06	1.E-06	0.8	0.8	1.E-06	1.E-06	0.8	0.8	1.E-06	1.E-06	0.8	0.8
	Ambient Air (Soil gas 5 to 12 Feet bgs) - Inhalation Pathway - in Excavation[4]	1.E-06	1.E-04	0.4	47	1.E-07	1.E-04	0.08	35	1.E-06	1.E-04	0.4	34
	TOTAL	**3.E-06**	**1.E-04**	**1.2**	**48**	**1.E-06**	**1.E-04**	**0.9**	**36**	**2.E-06**	**1.E-04**	**1.2**	**35**
Future On-Site Resident [3] RME - Adult	**Surface and Subsurface Soil to 12 ft bgs** – Oral /Dermal/Inhalation	2.E-05	2.E-05	0.3	0.3	2.E-05	2.E-05	0.3	0.3				
	Indoor Air (Soil gas 5 to 6 Feet bgs) – Inhalation Pathway[5]	3.E-05	3.E-03	0.4	30	3.E-06	4.E-03	0.08	45				
	Ambient Air (Soil gas 5 to 6 Feet bgs) - Inhalation Pathway	2.E-07	1.E-05	0.002	0.2	2.E-08	2.E-05	0.0004	0.2				
	TOTAL	**5.E-05**	**3.E-03**	**0.7**	**30**	**2.E-05**	**4.E-03**	**0.4**	**45**				
Future On-Site Resident [3] RME - Adult+Child	**Surface and Subsurface Soil to 12 ft bgs** – Oral /Dermal/Inhalation	4.E-05	4.E-05	0.9	0.9	4.E-05	4.E-05	0.9	0.9				
	Indoor Air (Soil gas 5 to 6 Feet bgs) – Inhalation Pathway[5]	4.E-05	3.E-03	0.5	38	4.E-06	5.E-03	0.11	57				
	Ambient Air (Soil gas 5 to 6 Feet bgs) - Inhalation Pathway	2.E-07	2.E-05	0.002	0.2	2.E-08	2.E-05	0.0005	0.3				
	TOTAL	**8.E-05**	**3.E-03**	**1.4**	**39**	**4.E-05**	**5.E-03**	**1.0**	**58**				
Future On-Site Resident [3] RME - Child	**Surface and Subsurface Soil to 12 ft bgs** – Oral /Dermal, Inhalation	3.E-05	3.E-05	3.2	3.2	3.E-05	3.E-05	3.2	3.2				
	Indoor Air (Soil gas 5 to 6 Feet bgs) – Inhalation Pathway[5]	2.E-05	1.E-03	0.9	71	1.E-06	2.E-03	0.20	105				
	Ambient Air (Soil gas 5 to 6 Feet bgs) - Inhalation Pathway	8.E-08	6.E-06	0.005	0.4	7.E-09	9.E-06	0.0010	0.5				
	TOTAL	**4.E-05**	**1.E-03**	**4.1**	**74**	**3.E-05**	**2.E-03**	**3.4**	**109**				

(3) Future residential development is unlikely for any area of the site. Calculations were only conducted on-site to provide a representative calculation for potential residential exposure.
(4) Ambient air exposure concentrations calculated from soil gas concentrations.
(5) Indoor air pathway was calculated using soil gas data since future buildings are not expected to have the same characteristics as the current building where indoor air samples were measured.
(6) For future scenarios there is only one set of soil data for on-site.

Section 1
Introduction

1.1 Scope and Objectives

This risk assessment presents an evaluation of potential human health risks and hazards associated with exposure to residual soil and groundwater contamination at the former Omega Chemical site (the Site). The Site is located at 12504/12512 East Whittier Boulevard (Figure 1-1). Because the Site is located in an urban area that has been developed for decades, provides no suitable habitat, and contaminated subsurface soils are covered with buildings, asphalt, or concrete, ecological impacts from the facility are not expected and are not evaluated in this report. California Environmental Protection Agency (CalEPA) will be performing an evaluation of habitat and ecological receptors in a separate report.

This Human Health Risk Assessment (HHRA) is consistent with the final On-site Soils Remedial Investigation/Feasibility Study Work Plan dated September 29, 2003 and follows risk assessment guidance from United States Environmental Protection Agency (USEPA) and with accommodations for consistency with similar guidance from CalEPA as necessary. The following documents formed the basis for the HHRA:

- Risk Assessment Guidance for Superfund, Volume I: Human Health Evaluation Manual (Part A).Interim Final.EPA/5401/1-891002.December 1989.
- USEPA Risk Assessment Guidance for Superfund: Volume I. Human Health Evaluation Manual. Part B, Development of Risk-Based Preliminary Remediation Goals. Interim. U.S. EPA. Washington, D.C. 1991.
- USEPA Risk Assessment Guidance for Superfund. Vol. 1: Human Health Evaluation Manual, Part E, Supplemental Guidance for Dermal Risk Assessment. EPA/540/R/99/005. 2004.
- CalEPA Supplemental Guidance for Human Health Multimedia Risk Assessments of Hazardous Waste Sites and Permitted Facilities. August 1996.
- CalEPA Selecting Inorganic Constituents as Chemicals of Potential Concern at Risk Assessments at Hazardous Waste Sites and Permitted Facilities. Human and Ecological Risk Division Department of Toxic Substances Control. February 1997.
- CalEPA DTSC Preliminary Endangerment Assessment Guidance Manual (reprinted from 1994). January 1999.
- CalEPA DTSC Guidance for the Evaluation and Mitigation of Subsurface Vapor Intrusion to Indoor Air. 2005.
- USEPA User's Guide for Evaluating Subsurface Vapor Intrusion into Buildings. March 14, 2003.

- USEPA Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites. OSWER 9355.4-24. 2002.

Additional USEPA and CalEPA documents and databases consulted for this HHRA are cited in the text and listed in Section 8.

1.2 USEPA Consent Decree

This HHRA has been prepared in accordance with Task 2 of the Statement of Work in Consent Decree No. 00-12471 between the United States Environmental Protection Agency (USEPA) and the Omega Chemical Site PRP Organized Group (OPOG). The Consent Decree was lodged on November 24, 2000 and entered into the US District Court on February 28, 2001.

Task 2 requires OPOG to "Implement a Vadose Zone Remedial Investigation/ Feasibility Study (RI/FS) For Contaminant Releases On, At, or Emanating From The Omega Property". The Site location and vicinity are illustrated on Figure 1-1. The figure also illustrates the Phase 1a area, where a groundwater remedy is currently being implemented in accordance with Task 1 of the Consent Decree. The groundwater remedy is expected to be operational in mid-2007.

1.3 Site History

The following section is a summary of information regarding previous owners, operations, and known historical chemical use at and in the vicinity of the Site.

1.3.1 Owners and Operators

The subject Site located at 12504/12512 East Whittier Boulevard was first developed in 1951. The Site occupies Los Angeles County Assessor Tract No. 13486, Lots 3 and 4. The Site is approximately 41,000 square feet (~0.94 acres) in area (200 feet wide x 205 feet long) and contains two structures – an approximate 140 by 50 foot warehouse and an approximate 80 by 30 foot administrative building. A loading dock is also attached to the rear of the warehouse. The exterior areas are concrete-paved and the Site is secured with a perimeter fence and locking gate.

Prior to initial construction of buildings in July 1951, the Site was used for agriculture; apparently the site has never been used for residential purposes. The Site was operated by Sierra Bullets prior to 1963. During operation of the Sierra Bullet facility, a 500-gallon underground storage tank (UST) was utilized for storage of kerosene. The UST was subsequently removed in 1987 by Fred R. Rippy, Inc.

From 1976 to 1991 Omega Chemical Corporation operated a treatment and disposal facility for commercial and industrial solid and liquid wastes and a transfer station for storage and consolidation of wastes for shipment to other treatment and/or disposal facilities.

Van Owen Holdings LLC of Los Angeles, California purchased the property in 2003. Star City Auto Body occupies the warehouse (12504 Whittier Blvd.) and performs auto body repair and painting on the premises. The auto body shop also leases the small paved parking lot north of the warehouse building for automobile parking. The former administrative building (12512 Whittier Blvd.) and larger paved parking area south of the warehouse have had a variety of tenants since 2003. The former administration building is currently unoccupied, and the parking lot is used for temporary storage of wooden pallets by L&M Pallets on a month-to-month lease basis.

1.3.2 Facility Processes and Chemical Usage

Limited information regarding volumes and types of wastes handled by the Omega Chemical Corporation is available for review. According to the Phase II Close Out Report (Hargis and Associates, England and Associates, October 1, 1996), Omega Chemical Corporation operated the facility for recycling and treatment of spent solvents and refrigerants. Drums and bulk loads of waste solvents and chemicals (primarily chlorinated hydrocarbons and chlorofluorocarbons) from various industrial activities were processed to form commercial products which were returned to generators or sold in the marketplace. An Operation Plan, prepared by Omega Chemical Corporation in 1990 for proposed expansion of the facility, provided a summary of current and proposed facility processes, tank capacities, incoming and facility-generated waste stream characteristics and handling practices, etc.

The majority of the 11 treatment units were located in the general area of the warehouse loading dock. As indicated in the Operation Plan, a total of 27 storage tanks with a combined storage capacity of 109,400 gallons were present at the facility in 1990. Six large, vertical storage tanks were arranged in an L-shaped pattern in the southern corner of the Site. Five process tanks were located in the northern yard, and were arranged in a linear pattern along the side of the warehouse. The locations of the smaller storage tanks were not indicated in the Operation Plan.

Wastes accepted by Omega Chemical Corporation for recycling were broadly characterized as organic solvents and chemicals, and aqueous wastes with organic waste constituents. Sources of the incoming waste were a wide assortment of manufacturing and industrial processes (petroleum refining, rubber and plastics, chemicals, paper and allied products, furniture and fixture products, lumber and wood products, printing and publishing, textile mill products, food and kindred products, etc.).

The treatment and transfer activities at Omega resulted in releases of chemicals to soil, soil gas, and groundwater at the Site, as evidenced by the results of previous site investigations (the first conducted in 1985 by LeRoy and Crandall Associates regarding subsurface contamination at the tank farm). Adjacent facilities, including the Terra Pave facility and the former Cal-Air facility (now owned by Medlin & Son), may have also released contaminants to Site media. A removal action was performed at Terra Pave to address lead contamination in soil. It is possible that lead in airborne

particulates from Terra Pave were deposited onto surface soils at the Site. Freon 113 results from the portion of the Omega Site nearest the former Cal-Air facility suggest the possibility of an off-site source.

The principal VOCs detected in the soil gas at the Omega site and at the highest concentrations were Freon 113, Freon 11, 1,1,1-TCA and PCE. The most prevalent contaminants detected in soil and groundwater are volatile organic compounds (VOCs), primarily tetrachloroethylene (PCE) and related compounds, trichloroethene (TCE), and freons. Chlorinated methane compounds, including methylene chloride and chloroform, as well as acetone and toluene, are also detected at the downgradient Site boundary and off-Site. No indications of dense non-aqueous phase liquids (DNAPLs) were identified in vadose zone soil; although some groundwater concentrations are indicative of either non-aqueous phase liquids (NAPL) or residual saturation of VOCs within or above the capillary fringe.

Material found within the loading dock sump contained the high concentrations of VOCs. The Phase 2 Close Out Report (England & Associates, Hargis + Associates, Inc., October 1, 1996) included a plan (Technical Memorandum No. 5 [TM5], February 22, 1996) for removal and disposal of contaminated soils found inside a sump located on the elevated loading dock area. Soil gas sample SG10R was collected at a depth of 6 feet from the soils contained within this sump during November 1995. TM5 and a subsequent addendum in response to EPA comments (TM5A, June 26, 1996) indicated that the sump dimensions were 6 feet x 6 feet, the total probed depth was 6 feet, and the sump was concrete-lined on all sides. TM5a indicated that the contaminated soil would be removed in July 1996 following EPA approval of the TM. Documentation of the proposed removal action was not provided in the Close Out Report. Very high concentrations of the following compounds were detected in the SG10R sample: Freon 11 (38,428,000 ppb/v), Freon 12 (8,536,000 ppb/v), Freon 113 (107,577,000 ppb/v), PCE (104,000 ppb/v), and 1,1,1-TCA (16,012,000 ppb/v). By comparison, the following significantly lower concentrations were detected at nearby RI soil gas sample location VP007 at a depth of 6 feet: Freon 11 (8,800 ppb/v), Freon 12 (not detected at a detection limit of 78 ppb/v), Freon 113 (31,000 ppb/v), PCE (65,000 ppb/v), and 1,1,1-TCA (32,000 ppb/v). It is presumed that all loading dock sump material was excavated, transported to an USEPA-approved off-Site disposal facility, incinerated, and disposed.

In August 2000, two concrete-lined sumps located in the loading dock area were drained of accumulated rainwater, and the sumps were pressure-washed and backfilled with concrete slurry. The drained fluids were transported to Demenno/Kerdoon for disposal. One of the loading dock sumps measured 6 feet by 6 feet by 6 feet. Based on the dimensions of the concrete-lined sump and its location in the loading dock, it was assumed to be the former soil-filled sump. Because the sump was concrete-lined on all sides, the SG10R soil gas sample collected from within the sump is not considered to be representative of concentrations in Site soils and has not been included in the risk assessment calculations. No other exposed or near-surface grossly contaminated materials were identified.

1.4 Potential Risk Issues

This HHRA addresses potential risks and hazards associated with residual soil contamination at the site. The HHRA evaluates the current and future use of the site for commercial purposes. Risk issues at the Site may include partitioning of volatile organic compounds (VOCs) from the soil matrix into soil gas and subsequently into ambient and indoor air. Because VOCs may accumulate to some extent indoors, inhalation of indoor air was quantitatively evaluated in the HHRA using measured indoor air vapor concentrations for current industrial workers. In addition to the Omega Site, potential for vapor intrusion was evaluated by building using indoor air data at the following areas:

- the parcel immediately to the north currently occupied by Medlin & Sons,
- the parcel immediately to the west currently occupied by TerraPave,
- the parcel to the south and west of the site (currently the occupied by the Bishop Company), and
- the parcel south of Bishop Company currently occupied by LA Carts and Oncology Care.

Minimum and maximum building concentrations were both evaluated to provide a potential range of risks and hazards. Measured concentrations of VOCs in indoor air from the parcel immediately to the south of the site (former location of the Skateland facility) were not included in the analysis since demolition of this building was completed on April 4, 2007. Because measured indoor air concentrations in current buildings may not represent future indoor air concentrations, indoor air exposure concentrations for future industrial workers and hypothetical residential receptors were evaluated using soil gas data modeled in a spreadsheet model to estimate indoor air concentrations.

Inhalation of ambient air was evaluated for current industrial workers using measured ambient air concentrations. However, because measured ambient air concentrations may not represent future ambient air concentrations, ambient air exposure for construction workers, industrial workers, and residents were estimated by modeling soil gas concentrations. Measured ambient air data were also compared to these modeled values in the uncertainties section.

In addition, construction workers at the Site may also be in direct contact with contaminated subsurface soil through incidental ingestion or dermal contact. These scenarios are evaluated in the HHRA for soil. The HHRA did not address these scenarios for soil at the above defined separate parcels. Soil sampling locations were concentrated on and along the border of the Omega site.

Currently, groundwater underlying the Site and in the immediate vicinity is not used for any purpose. Use for potable purposes within this area is also unlikely for the

future due to the presence of high concentrations of total dissolved solids (TDS). As shown in Table 1-1, TDS concentrations in groundwater samples from 2004 to 2006 ranged from 630 to 1,700 milligrams per liter (mg/L). The USEPA secondary standard for TDS in drinking water is 500 mg/L while the CalEPA maximum contaminant level (MCL) for drinking water ranges from 500 mg/L (recommended) to 1,000 mg/L (upper) with a short-term concentration of 1,500 mg/L. Use of groundwater at and downgradient of the site will be addressed in a separate report, and is not included in this risk assessment. However, risks from contaminated groundwater could theoretically result from volatilization of groundwater contaminants into ambient and indoor air this possibility is highly unlikely due to the 30-foot clay layer boundary above the water table.

Currently, no plans exist for residential development at the Site, and the Site location suggests that residential development in areas adjacent to the Site is unlikely. The City intends to allow redevelopment that consists of commercial and retail uses with the construction of multi-level buildings. Specifically, City representatives have stated that it is unlikely that the Omega property will be redeveloped for residential uses (Adams, 2007). Therefore, residential use of the site is not expected to occur in the future and, residential exposures are not significant risk issues. However, quantitative analysis of future residential exposures is provided to provide additional information to the risk manager. Section 3 provides a more detailed discussion of current and reasonable future land uses of the site.

1.5 Overview of Risk Assessment Findings

Results of the risk assessment suggest that contaminated soils at the site could present a significant threat to current and future commercial/industrial workers, future construction workers, and hypothetical future residents. Cancer risk estimates ranged from 4E-7 to greater than the upper end of the USEPA risk range of 1E-4. Hazard indices slightly exceeded one for current commercial/industrial workers at parcels other than the Site Parcel and were greater than one for future commercial/industrial workers, future construction workers, and future residents. Exposures to soil are unlikely under current conditions because of cover of most of the site with hardscape (buildings, concrete, and asphalt). However, future development could result in the removal of existing hardscape resulting in completed exposure pathways for future receptors. Risks and hazards are primarily attributable to inhalation of indoor air for current and future commercial/industrial indoor workers and future residents and ambient air for future outdoor commercial/industrial workers.

Possible risks associated with exposure to vapors intruding into indoor air spaces for current commercial/industrial workers are typically in the upper half of EPA's target risk range of 1E-6 to 1 E-4 (9E-6 to 1E-4). HI estimates associated with current exposure for vapors intruding into indoor air spaces fell in the range of less than one to about 7.7. Possible risks associated with exposure to vapors intruding into indoor air spaces for future commercial/industrial workers are typically in the upper half of EPA's target risk range 8E-7 to 5E-4. HI estimates for vapors intruding into indoor air

spaces for these receptors fell in the range of less than one to about 7. Risks associated with exposure to vapors intruding into indoor air spaces were highest for hypothetical future residents with risks ranging from 1E-6 to 5E-3, above EPA's target risk range. HI estimates for vapors intruding into indoor air spaces for these residents ranged from less than one to 109.

Risks and hazards were estimated for the Omega site and for surrounding parcels. VOCs in ambient air, as measured at the site, may account for 10 to 50 percent of these risks depending on the parcel.

The basis for these risk estimates is provided in detail in the remainder of this report.

1.6 Report Organization

Following a brief description of the site geology and hydrology in Section 2, this HHRA was conducted in four phases as defined in Cal EPA and U.S. EPA guidance, including:

- Identification of chemicals of potential concern (COPCs) that exist in sufficient quantities to present a public health risk (Hazard Identification, Section 3)
- Analysis of ways in which people might be exposed to COPCs (Exposure Assessment, Section 4)
- Evaluation of the toxicity of COPCs that may present public health risks (Toxicity Assessment, Section 5)
- Characterization of the magnitude and location of potential health risks for the exposed community (Risk Characterization, Section 6)

Uncertainties, summary and conclusions, and references are provided in Sections 7, 8, and 9, respectively. Risk calculations are provided in Appendix A.

OMEGA CHEMICAL

SITE VICINITY MAP

CDM

FIGURE 1-1

Table 1-1
Summary of Historical Total Dissolved Solids Concentrations

Sample Date	Number of Samples	CalEPA Maximum Contaminant Level (mg/L)	USEPA Secondary Standard (mg/L)	TOTAL DISSOLVED SOLIDS CONCENTRATION (mg/L)	
				Minimum Detected	Maximum Detected
June-1996	1	500 (recommended); 1,000 (upper); 1,500 (short–term)	500	5,900	5,900
March-2004	16			800	1,700
June-2004	25			630	1,600
September-2004	16			780	1,600
November-2004	2			860	970
December-2004	23			660	1,500
August-2005	1			1,200	1,200
March-2006	3			660	1,140
September-2006	5			950	1,150

mg/L = milligrams per liter

Section 2
Physical Setting

A detailed description of the physical setting of the site including boring logs and cross-sections is provided in Section 2.4 of the pre-final On-Site Soils RI Report (CDM, 2007). This section provides a summary of the local geology and hydrogeology of the site.

2.1 Climate

The climate of the area is characterized as semi-arid, with an average annual precipitation of approximately 16 inches. Precipitation occurs mainly during the winter and spring months.

2.2 Surface Topography

The land surface at the former Omega Chemical property slopes to the southwest to south-southwest at approximately 0.016 feet per foot, and is situated at approximately 220 feet above mean sea level (msl).

2.3 Local Geology and Hydrogeology

In the vicinity of the former Omega Chemical property, groundwater is typically encountered between 70 and 80 feet bgs, and flows to the southwest. Table 2-1 summarizes water levels recorded in the Omega vicinity between 2001 and 2006. Well locations are shown on Figure 2-1.

Regional hydrogeologic information is inconclusive on the presence or absence of major regional named aquifers in this portion of the Whittier Area. A cross-section about 1.5 miles south of the former Omega Chemical property presented in Bulletin 104 (DWR, 1961) suggests that the uppermost aquifers present are the Gage and Jefferson Aquifers. The upper portion of the shallow aquifer may represent the Gage aquifer, while the lower aquifer is potentially the Hollydale or Jefferson aquifer. The Gage aquifer is the major water bearing member of the Lakewood formation in the Whittier area, where it consists of about 30 feet of sand with some interbedded clay. It can attain maximum depths of 150 feet. The Jefferson aquifer is part of the Lower Pleistocene San Pedro formation that underlies the entire Whittier Area. The formation is composed of sand and gravel with interbedded clay, likely of marine origin. It ranges in thickness from 20 to 40 feet and reaches a maximum depth of 350 feet.

Below the Gage and Jefferson aquifers are deeper members of the Lower Pleistocene San Pedro formation. From shallowest to deepest, they are the Hollydale, Lynwood, Silverado, and Sunnyside aquifers. The Hollydale aquifer may be located beneath the Site, as the Site is located in the western part of the Whittier Area. It ranges in thickness from 10 to 25 feet and reaches to a maximum depth of 100 feet, and merges with the overlying Gage near South Whittier. The Lynwood aquifer ranges in

thickness from 50 to 100 feet and extends to a maximum depth of 460 feet; the Silverado aquifer ranges in thickness from 110 to 300 feet, and extends to a depth of 750 feet; while the Sunnyside aquifer consists of 200 to 300 feet of sand and gravel and reaches a depth of 1,000 feet.

2.3.1 Vadose Zone

The vadose zone is generally comprised of clayey silts with occasional sand lenses. The shallower interbedded silty clays and clays are characterized by alternating layers of high and low soil conductivity materials. An important lithologic layer starting at an approximate depth of 30 feet bgs (hereinafter referred to as the 30-foot unit) was found dipping to the west and southwest. The 30-foot unit has a characteristic double peak signature on the MIP conductivity logs, with a lower conductivity interbed in the middle of the unit likely consisting of siltier materials. Nearly all borings show a 1- to 4-foot thick unit with lower conductance, interpreted to be a sandy to silty lithology with less clay overlying the marker bed. The "30-foot zone" itself is between 3.5 to 11 feet thick. The top of the zone slopes generally to the west-southwest with a southwesterly trough directly beneath the center of the Site.

2.3.2 Saturated Zone

Groundwater investigations performed to date have indicated the presence of the two aquifer zones present at the Site, separated by a low permeability confining zone. The first sandy zone is encountered near the first occurrence of groundwater. It originates a short distance southwest of the former Omega Chemical property and thickens dramatically to the west. MIP borings and soil borings advanced at the former Omega Chemical property indicate that the sandy unit does not exist beneath the former Omega Chemical property. The sandy unit was observed in borings along Putnam Street (west of the former Omega Chemical property) and is up to 35 feet thick at downgradient well OW-4/4B. In the MIP borings at the western edge of the former Omega Chemical property, the sandy zone is characterized by low conductivity between 45 and 60 feet bgs. The unit is characterized by fine to medium sands.

The shallow unconfined aquifer may also thin toward the north along Putnam Street, which is perpendicular to the general flow direction. The shallow aquifer configuration shows the presence of a lower permeability zone splitting the upper aquifer north of PZ1. The uppermost sand unit within the upper aquifer appears continuous below the water table elevation from H-7 at the northern end to EW-5 at the southern end of the section.

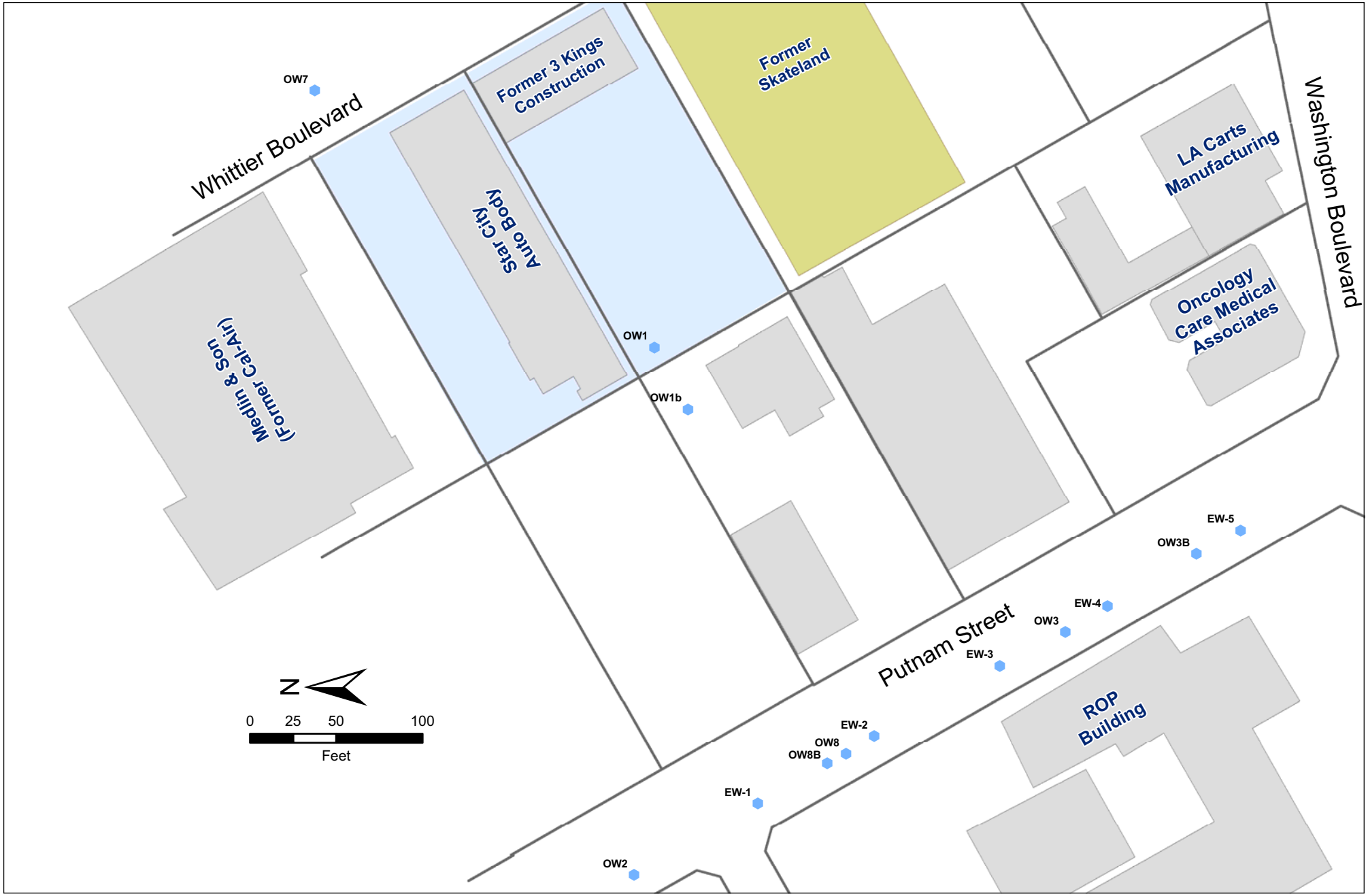
Based on water levels at the OW4 and OW8 locations, where both deep and shallow zone completions are available, the groundwater elevations are significantly higher in the shallow aquifer. A similar difference in water level, with an indicated downward gradient, was observed at the cluster at OW1/1b. This indicates that a significant confining zone limits flow between these zones.

Similar to the shallower unconfined aquifer, the deeper confined aquifer may also thin under the former Omega Chemical property and thicken to the west. Only the

deeper wells to the west penetrate into this unit; it was not observed at well OW-1B at Terra Pave. The deeper confined aquifer is characterized by sand with some silt.

2.3.3 Groundwater Flow and Aquifer Characteristics

Groundwater flow in the upper aquifer has been consistently towards the southwest based on depth to water and groundwater elevation data collected and contour maps prepared since mid-2001. Numerous aquifer tests have been performed on Omega wells over the past 7 years, as follows: slug tests ands step-drawdown testing on wells OW-1b, OW-2, and OW-3 in 1999; short-term (approximately 4 hours) constant discharge testing on wells OW-2, OW-3, OW4a, and OW8 in 2003; and more recently approximately 24-hours of constant discharge testing performed in September 2006 on five wells installed in mid-2006 (EW-1 through EW-5) that are proposed for groundwater extraction as part of the Phase 1a area groundwater remedy. A technical memorandum detailing testing procedures and an evaluation of the testing results was prepared and submitted to USEPA in late-2006 (CDM, November 7, 2006).



DRAFT

CDM

Legend

- Property Boundary
- Former Omega Chemical Property
- Existing Building
- Former Building
- Groundwater Sample Location

Omega Chemical
Groundwater Well Locations

Figure 2-1

Table 2-1
Omega Chemical Superfund Site
Groundwater Elevation Summary

Date	Well ID	EW-1	EW-2	OW-1	OW-1b	OW-2	OW-3	OW-3b	OW-4a	OW-4b	OW-5	OW-6	OW-7	OW-8	OW8b
	TOC Elev (ft MSL)			210.30	204.98	200.10	196.33	194.86	182.47	182.22	151.96	170.54	212.01	198.42	198.65
5/15/2001	DTW (ft btoc)			74.19	72.30	66.47	62.55		53.60	57.11	--	--	--	--	--
	GW Elev (ft MSL)			**136.11**	**132.68**	**133.63**	**133.78**		**128.87**	**125.11**	--	**--**	--	**--**	**--**
6/14/2001	DTW (ft btoc)			74.14	72.53	66.38	62.44		53.36	57.51	--	--	--	--	--
	GW Elev (ft MSL)			**136.16**	**132.45**	**133.72**	**133.89**		**129.11**	**124.71**	--	**--**	--	**--**	**--**
7/24/2001	DTW (ft btoc)			74.04	73.36	66.25	62.29		53.31	58.82	--	--	--	--	--
	GW Elev (ft MSL)			**136.26**	**131.62**	**133.85**	**134.04**		**129.16**	**123.40**	--	**--**	--	**--**	**--**
8/16/2001	DTW (ft btoc)			74.08	74.18	66.34	62.39		53.70	60.01	26.14	42.54	--	--	--
	GW Elev (ft MSL)			**136.22**	**130.80**	**133.76**	**133.94**		**128.77**	**122.21**	**125.82**	**128.00**	--	**--**	**--**
9/18/2001	DTW (ft btoc)			74.33	74.75	66.66	62.70		54.35	60.82	27.33	43.25	--	--	--
	GW Elev (ft MSL)			**135.97**	**130.23**	**133.44**	**133.63**		**128.12**	**121.40**	**124.63**	**127.29**	--	**--**	**--**
10/18/2001	DTW (ft btoc)			74.84	74.83	66.95	62.98		54.76	60.98	27.59	43.69	--	--	--
	GW Elev (ft MSL)			**135.46**	**130.15**	**133.15**	**133.35**		**127.71**	**121.24**	**124.37**	**126.85**	--	**--**	**--**
11/15/2001	DTW (ft btoc)			74.38	75.49	66.92	62.95		54.87	61.67	28.18	43.95	--	--	--
	GW Elev (ft MSL)			**135.92**	**129.49**	**133.18**	**133.38**		**127.60**	**120.55**	**123.78**	**126.59**	--	**--**	**--**
12/14/2001	DTW (ft btoc)			74.80	75.05	67.28	63.33		55.43	60.76	28.24	44.41	--	--	--
	GW Elev (ft MSL)			**135.50**	**129.93**	**132.82**	**133.00**		**127.04**	**121.46**	**123.72**	**126.13**	--	**--**	**--**
1/18/2002	DTW (ft btoc)			74.92	74.12	67.40	63.52		55.55	59.53	27.44	44.39	--	--	--
	GW Elev (ft MSL)			**135.38**	**130.86**	**132.70**	**132.81**		**126.92**	**122.69**	**124.52**	**126.15**	--	**--**	**--**
2/14/2002	DTW (ft btoc)			74.86	73.56	67.31	63.36		55.21	58.81	26.73	44.00	--	--	--
	GW Elev (ft MSL)			**135.44**	**131.42**	**132.79**	**132.97**		**127.26**	**123.41**	**125.23**	**126.54**	--	**--**	--
3/13/2002	DTW (ft btoc)			75.13	74.52	67.50	63.58		55.30	59.34	26.75	44.01	74.83	65.61	**--**
	GW Elev (ft MSL)			**135.17**	**130.46**	**132.60**	**132.75**		**127.17**	**122.88**	**125.21**	**126.53**	**137.18**	**132.81**	--
4/19/2002	DTW (ft btoc)			75.16	NM	67.52	63.61		55.35	60.02	27.12	44.12	74.93	65.69	**--**
	GW Elev (ft MSL)			**135.14**	**NM**	**132.58**	**132.72**		**127.12**	**122.20**	**124.84**	**126.42**	**137.08**	**132.73**	--
8/20/2002	DTW (ft btoc)			75.97	77.04	68.30	64.47		56.80	63.64	30.03	45.70	75.86	66.46	**--**
	GW Elev (ft MSL)			**134.33**	**127.94**	**131.80**	**131.86**		**125.67**	**118.58**	**121.93**	**124.84**	**136.15**	**131.96**	--
2/19/2003	DTW (ft btoc)			76.70	77.04	69.44	65.58		58.58	62.46	30.85	47.49	76.89	67.37	**--**
	GW Elev (ft MSL)			**133.60**	**127.94**	**130.66**	**130.75**		**123.89**	**119.76**	**121.11**	**123.05**	**135.12**	**131.05**	--
8/26/2003	DTW (ft btoc)			76.95	78.75	69.18	65.54		58.13	65.67	31.20	47.09	76.90	67.35	**--**
	GW Elev (ft MSL)			**133.35**	**126.23**	**130.92**	**130.79**		**124.34**	**116.55**	**120.76**	**123.45**	**135.11**	**131.07**	--
02/2004	DTW (ft btoc)			76.97	80.93	70.40	66.35		61.04	68.08	35.21	50.24	78.00	68.36	**--**
	GW Elev (ft MSL)			**133.33**	**124.05**	**129.70**	**129.98**		**121.43**	**114.14**	**116.75**	**120.30**	**134.01**	**130.06**	--
08/25-26/2004	DTW (ft btoc)			**78.84**	**82.80**	71.24	67.13		62.36	71.10	36.78	51.69	78.96	69.15	86.77
	GW Elev (ft MSL)			**131.46**	**122.18**	**128.86**	**129.20**		**120.11**	**111.12**	**115.18**	**118.85**	**133.05**	**129.27**	**111.88**
02/23-25/2005	DTW (ft btoc)			77.22	79.95	71.82	67.20		63.94	65.97	38.17	53.58	78.98	69.50	81.55
	GW Elev (ft MSL)			**133.08**	**125.03**	**128.28**	**129.13**		**118.53**	**116.25**	**113.79**	**116.96**	**133.03**	**128.92**	**117.10**
08/23-25/2005	DTW (ft btoc)			76.15	75.76	68.77	64.69		58.98	61.15	29.62	47.68	75.94	66.87	76.31
	GW Elev (ft MSL)			**134.15**	**129.22**	**131.33**	**131.64**		**123.49**	**121.07**	**122.34**	**122.86**	**136.07**	**131.55**	**122.34**
02/17-22/2006 [1]	DTW (ft btoc)			75.33	75.77	67.87	63.90	73.76	58.03	62.27	30.11	46.93	75.21	66.05	77.55
	GW Elev (ft MSL)			**134.97**	**129.21**	**132.23**	**132.43**	**121.10**	**124.44**	**119.95**	**121.85**	**123.61**	**136.80**	**132.37**	**121.10**
08/22-24/2006	DTW (ft btoc)			74.94	75.00	67.43	63.70	73.38	56.87	61.13	28.99	45.70	74.67	65.66	76.58
	GW Elev (ft MSL)			**135.36**	**129.98**	**132.67**	**132.63**	**121.48**	**125.60**	**121.09**	**122.97**	**124.84**	**137.34**	**132.76**	**122.07**
02/20-02/22/07 [2]	DTW (ft btoc)	66.96	65.87	75.35	75.47	67.97	64.24	73.94	57.77	62.10	30.17	46.16	75.28	66.28	77.29
	GW Elev (ft MSL)	**-66.96**	**-65.87**	**134.95**	**129.51**	**132.13**	**132.09**	**120.92**	**124.70**	**120.12**	**121.79**	**124.38**	**136.73**	**132.14**	**121.36**

TOC - Top of Casing
Elev - Elevation
ft MSL - feet mean sea level
DTW - Depth to Water
ft btoc - feet below top of casing
GW Elev - Groundwater Elevation

[1] OW3b installed March 6, 2006 and measured March 13, 2006.
[2] EW-1 and EW-2 installed on March 6, 2006.

Section 3
Data Analysis and Identification of Chemicals of Potential Concern

This section presents a summary of data available for the HHRA, a summary of the data evaluation, and the selection of preliminary Chemicals of Potential Concern (COPCs). Chemicals selected as COPCs were evaluated quantitatively. Data used in the HHRA were obtained from recent sampling events conducted by CDM and include soil, soil gas, and indoor and ambient air samples. As previously discussed, groundwater underlying the Site and in the immediate vicinity is currently not used for any purpose nor is it likely to be used for potable use in the future due to high concentrations of TDS. Further, a groundwater remedy is expected to be operational in mid-2007. Groundwater exposure pathways are not directly evaluated in this risk assessment. However, any groundwater vapor off-gassing was considered by the direct collection of indoor air samples or, in the case of the former Skateland parcel, measured concentrations of VOCs in soil gas..

A preliminary data evaluation was performed to determine the usability of existing data for the HHRA. Selection of data used to support quantitative evaluation is based on quality, quantity, comparability (e.g., similar detection limits), and representativeness of data for current site conditions and potential exposures at the site. During data evaluation, a set of data appropriate for use in qualitative and quantitative risk assessment is compiled. These data are then used in selection of COPCs and in estimation of exposure point concentrations used in the calculation of possible chronic daily intake. A more extensive discussion of data quality is provided in the pre-final On-Site Soils RI Report, which was submitted on June 20, 2007 (CDM, 2007).

3.1 Data to Support Human Health Risk Assessment

During the RI, samples were collected from surface soils, subsurface soils, soil gas, indoor air, and ambient air. Sample locations are shown in Figures 3-1 and 3-1b and analytical summary tables for all samples collected during the RI are provided in the RI report. Please refer to the tables and text provided in the RI report for a summary of analytical results. Sampling objectives, rationale, methodology, and locations are described in Section 3 of the RI report.

Approximately 208 soil samples of which 8 were duplicates were collected during roughly 13 sampling events from 1995 to 2006. Soil samples were collected at approximately 66 locations at depths up to 120 feet below ground surface (bgs). Soil samples were analyzed for a comprehensive suite of analyses including VOCs, SVOCs, metals and pesticides. Although historic soil samples (samples collected in 1995 to 1999) were included in the analysis, historic soil results for VOCs were not included because current soil, soil gas and indoor air samples are likely more representative of current conditions for VOCs at the site.

In addition, during the implementation of Task 1 of the Consent Decree, approximately 298 groundwater samples of which 34 were duplicates were collected during roughly 32 sampling events from 1996 to 2006. Groundwater samples were analyzed for a comprehensive suite of analytes including VOCs, SVOCs, and metals. Only data from groundwater samples collected from October 2004 to September 2006 are used in the qualitative risk analysis. Although groundwater samples were collected as early as 1996, these earlier samples cannot be assumed to be representative of current conditions.

Soil gas samples were collected from a total of 97 locations at depths up to 71 feet bgs. Seven sampling events occurred from 2004 to 2006, and a total of 271 samples (of which 31 were duplicates) were collected. Soil gas samples were collected in Summa canisters and analyzed by an off-site laboratory for VOCs using EPA Method TO-15.

Historical soil gas sampling results were not included because evaluation of the historical soil gas sampling results provided in the Phase II Close Out Report (Hargis + Associates, Inc. and England & Associates, October, 1996) indicated several potential deficiencies with the data, as follows: a notation on the analytical results summary table provided in the document indicated that the soil gas results were "preliminary", copies of the analytical reports were not provided and so were not available for review, and the mobile laboratory used was not identified nor were analytical quality assurance/quality control procedures discussed. In addition, non-detections for all tested VOCS were reported for seven samples (SG1 at 6 and 12 feet, SG4 at 16.7 feet, SG8 at 6 feet, SG15 at 6 and 12 feet, and SG31 at 3.5 feet). Though detection limits were higher in 1996 than during the RI, these non-detections are suspect given the elevated concentrations found throughout the Omega property during the RI. Therefore, the historical pre-RI soil gas results were not included in the risk analysis. Historical sampling locations are shown on Figure 3-2. As shown on Figure 3-1 and 3-1b, a sufficient number of soil gas samples were collected during the RI to perform the risk analysis provided in this document.

2004 to 2006 soil gas data were used for quantitative risk analysis for future scenarios (hypothetical residential scenario and future construction scenario) on the site and most surrounding parcels. These data were also used to estimate a range of attenuation factors to assist in evaluation of a future commercial/industrial land use scenario.

Sixty-eight indoor air samples (of which 11 are duplicates) were collected from 25 locations during seven sampling events from 2004 to 2006. Thirteen ambient air samples (including one duplicate) were collected from nine locations during four of these sampling events. Air samples were collected in Summa canisters and analyzed by an off-site laboratory for VOCs using EPA Method TO-15, TO-15 SIM, or TO-14.

In conjunction with the soil vapor survey, soil conductivity profiling was performed during the RI using the Membrane Interface Probe (MIP) system. Evaluation of the soil conductivity and lithologic logs indicated the presence of a continuous clay unit

underlying the Site and adjacent areas at an approximate depth of 30 feet bgs. This unit, identified in the RI report as the "30-foot clay unit" inhibits to the upward migration of soil vapors emanating from vadose zone soils below the 30-foot clay unit, including off-gassing from groundwater. The 30-foot clay layer also inhibits the vertical migration of contaminants from moving to greater depths. This unit is described at length in the RI report.

The protocol used and data generated from all of the sampling efforts are discussed in detail in the RI Report.

3.2 Data Evaluation

Chemical data were reviewed to determine overall usability, for assessing potential human health risks. Data were evaluated to assess precision, accuracy, representativeness, completeness, comparability (PARCC parameters) and sensitivity (blanks). Analytical results for data and details of the data quality assessment are presented in the RI Report. This assessment also includes a review of appropriateness of the reporting limits for risk assessment purposes. Data were found to be of high quality and are considered useable for risk assessment purposes.

Data representativeness is one of the most important criteria evaluated when selecting data for use in the quantitative HHRA. Representativeness is the extent to which available data characterize potential exposure conditions for human or ecological receptors. Proper selection of sampling locations, consideration of potential hot spots, assessment of background concentrations, and collection of a sufficient number of samples help maximize data representativeness. The RI data were collected in contaminated or potentially contaminated areas and in areas where human contact is possible either currently or in the future.

Soil samples were collected throughout the Omega parcel and from variable depths, providing extensive documentation of the nature and extent of contamination at the site. Sampling was somewhat biased toward areas of known or suspected releases, so that the database as a whole is likely to be somewhat biased toward higher levels of contamination. Any such bias should result in overestimation of potential risks. Soil samples were not collected from surrounding parcels. Concentrations of chemicals in site soil were considered a worst-case for site-related off site contamination.

Indoor air samples were collected in one to several rounds, depending on the parcel as defined in Section 1. Multiple rounds of indoor air sampling help to minimize impact of any seasonal impacts. Moreover, several indoor air samples were collected in each building, from different areas. Multiple samples within a building help to minimize impacts of ventilation on VOC concentrations and help determine if and where building sources (e.g. consumer products) may impact results. Indoor air samples can be characterized as reasonably representative of indoor air quality in buildings on and around the site. Indoor air data may also reflect building sources rather than or in addition to vapors intruding from the subsurface. Thus, indoor air

data may be biased by building sources unrelated to VOCs previously released at the Omega site.

3.3 Identification of Chemicals of Potential Concern

General methods for selection of COPCs followed basic USEPA and CalEPA policy of initially including chemicals observed at the site, regardless of potential for human health risk, and putting any risks due to exposure to chemicals at the site in perspective during the risk characterization. In keeping with this policy, all chemicals detected in media at the site were retained as COPCs, with the following few exceptions:

- Inorganic soil constituents that are essential minerals and/or are present only at concentrations consistent with local ambient conditions were eliminated.
- Chemicals detected with a frequency of less than 5 percent, provided that other criteria as described below were met, were eliminated.
- Chemicals without available toxicity criteria were not retained as COPCs.

The tables listing detected chemicals and their summary statistics provided in this section are the same as the RAGS Part D tables in Appendix A-3, Tables 2.1 through 2.6, as available. RAGS Part D tables were not created for media that were not identified as complete exposure pathways (e.g. groundwater), so tables summarizing these media have a different format. A summary of the selection of COPCs is described in text in the following sections.

3.3.1 Non-Toxic and Essential Minerals

Several metals that are generally recognized as non-toxic and are essential minerals will not be addressed in the risk assessment. Eliminated chemicals include calcium, sodium, potassium, magnesium, chloride, fluoride, nitrate, and nitrite. Nitrate and nitrite do not have screening criteria for soil and will not be COPCs for soil. Water concentrations are far below levels of concern, and potential exposure via drinking water is not evaluated in this HHRA. Since these constituents are not volatile, no potential exposure pathways exist and these chemicals will not be quantitatively evaluated. Fluoride does have soil screening criteria, but no soil data are available for fluoride. This chemical is also nonvolatile. Since groundwater exposure is not evaluated, fluoride also will not be quantitatively evaluated.

Some essential minerals, such as iron and manganese, were not eliminated in this step. Such metals, though essential, can be associated with adverse effects and were retained unless eliminated in subsequent COPC selection steps.

3.3.2 Analysis of Ambient Concentrations of Arsenic

Local ambient concentrations of arsenic in soil were assessed using guidance developed by the Department of Toxic Substances Control (DTSC) for selection of

inorganic constituents as chemicals of concern (DTSC 1997). For this analysis, soil data for the site are combined into a single data set and plotted on a normal probability plot. Typically, both untransformed and lognormally transformed data are plotted, because the distribution of environmental data often approximates lognormal. These plots and summary data statistics are then evaluated. Where one of the normal probability plots approximates a straight line, the total data range is about an order of magnitude or less, and the coefficient of variation is less than one (i.e., data variability is low), the data are likely to be part of a single, local ambient distribution. Where normal probability plots are clearly non-linear and show one or more "inflection points", more than one population is likely to be present, and only those data that fulfill the above criteria can be considered to represent local ambient conditions. Typically, when inflection points are identified in the plots, data range is greater than an order magnitude, and the coefficient of variation is greater than one and often much higher.

The probability plot of the arsenic soil data from the Omega site is a straight line suggesting a single population of arsenic concentrations. These data likely represent local ambient conditions, not arsenic releases from the site. This conclusion is bolstered by the relatively small data range (0.8 to 21 mg/kg), and the small coefficient of variation (about 0.65). The highest value of 21 mg/kg is followed by the next highest arsenic concentration of less than 10 mg/kg along with the remaining 39 soil sample results in the data base.The distribution of sample locations (as presented in the RI) indicates substantial coverage of the Omega site (41 samples distributed over less than one acre) suggesting that the single higher value does not represent a substantial hotspot. This observation is consistent with the location of the single higher value at the northeast corner of the site parcel. Operations are not known to have been carried out in this location.

Evaluation of arsenic soil data for the site indicates that arsenic is present at local ambient levels. The single higher value in the data set is most likely a data artifact. Data are sufficiently robust to eliminate the possibility that this single value represents a significant hotspot at the site. On this basis, arsenic was eliminated as a COPC at the site. Results of the statistical analysis are provided in Appendix B.

3.3.2 Frequency of Detection

Chemicals that are detected very infrequently at a site are not likely, with few exceptions, to contribute significantly to overall risk. Many chemicals reported in samples collected from soils at the site were in fewer than 5 percent of samples. These chemicals may not represent a significant release at the site, and may not, in some cases, be site-related. Thus, elimination of these chemicals makes the risk assessment much less cumbersome and much more focused on significant releases at the site. However, prior to eliminating infrequently detected chemicals, several criteria must be met as described below.

Infrequently detected chemicals were not eliminated if they were: 1) known human carcinogens; 2) were detected at very high concentrations compared to minimum

levels that could be associated with adverse effects (e.g. OEHHA soil California Human Health Screening Levels [CHHSLs], 2005b); and/or 3) were found at the site in localized "hotspots." Hotspots are defined as relatively small areas with chemical concentrations that are significantly higher than those in surrounding areas. In most, but not all, cases, hotspots correlate with source areas.

Chemicals that were infrequently detected and do not fall into any of the above categories were eliminated from the quantitative assessment. Chemicals eliminated include:

- Benzyl alcohol, benzo(g,h,i)perylene, diethylphthalate, di-n-butylphthalate, di-n-octylphthalate, and endrin in soil, 0 to 2.2 feet bgs
- Acetone, benzo(g,h,i)perylene, and cis-1,2-dichlorothene in soil, 0 to 12 feet bgs
- 1,2-Dichlorobenzene, 1,4-dichlorobenzene, acetone, benzo(g,h,i)perylene, bromoform, cis-1,2-dichloroethene (cis-1,2-DCE), diethylphthalate, di-n-butylphthalate, di-n-octylphthalate, endrin, trans-1,3-dichloropropene, trans-1,2-dichloroethene (trans-1,2-DCE), total xylenes, and vinyl acetate in soil, 0 to 30 feet bgs
- 1,1,2-Trichloroethane, 2-butanone, n-hexane, and o-xylenes in all parcels and site parcel soil gas, 5 to 6 feet bgs
- 4-Ethyltoluene and 4-methyl-2-pentanone in all parcel soil gas, 5 to 30 feet bgs
- 1,2,4-Trimethylbenzene, 2-propanol, 4-Ethyltoluene, and ethanol in site parcel soil gas, 5 to 30 feet bgs
- 4-Methyl-2-pentanone in other parcels soil gas, 5 to 30 feet bgs
- 1,2,3-Trichloropropane; 1,2,4-trichlorobenzene; 4-chlorotoluene; carbon disulfide; fluorene; isophorone; pentachlorophenol (PCP); phenanthrene; and methyl acetate in groundwater

3.3.3 Chemicals without Toxicity Criteria

Toxicity criteria have not yet been established for all detected chemicals. Quantitative risks and hazards can not be calculated in the absence of these toxicity criteria. As such, these chemicals were removed from the quantitative analysis. Uncertainties regarding their removal are discussed in Section 6.4. The only chemical eliminated based on lack of toxicity criteria was:

- Benzo(g,h,i)perylene in soil for 0 to 2.2 feet bgs, 0 to 12 feet bgs, and 0 to 30 feet bgs

3.3.5 Selection of COPCs for Soil

Because some exposure pathways are limited to surface soil and others to subsurface soil, surface soil and subsurface soil were assessed separately. Surface soil includes samples up to 2.2 feet bgs. Subsurface soil was divided into three categories – greater than 2.2 feet to 12 feet bgs, greater than 12 feet to 30 feet bgs and greater than 30 feet bgs. The 12-foot bgs limit was selected to represent the maximum depth to which a resident or a construction worker could be exposed following or during regrading at the site. Summary statistics for soil data are presented in Tables 3-1, 3-2, and 3-3. These tables show minimum and maximum concentrations, the range of reporting limits, and the detection frequency for detected constituents in soil. In Table 3-2, subsurface soil from greater than 2.2 to 12 feet bgs were combined with the surface soil data to create a soil data set that represents soil if the site were regraded, mixing surface soil with subsurface soil.

Samples from depths below 12 feet bgs (Table 3-3) were not used in the quantitative risk assessment; however, these samples were examined to help ensure that no constituents were being overlooked. Table 3-4 provides a comparison of the greater than 12 feet bgs data with the less than 12 feet bgs data. Chemicals in samples depths below 12 feet bgs that were detected at frequencies greater than 5% that were not included as COPCs in the 0 to 12 feet bgs data include: 1,1,2-trichloro-1,2,2-trifluoroethane, benzene, cis-1,2-DCE, methylene chloride, toluene, trans-1,2-DCE, and trichlorofluoromethane. However, none of the maximum detected concentrations of these chemicals exceeded one-tenth of the USEPA Region 9 PRG for residential soil. Therefore, none of these chemicals are likely to figure prominently in a risk assessment of the site. Thus, no additional COPCs were identified.

3.3.6 Selection of COPCs for Groundwater

Groundwater samples collected from October 2004 to September 2006 (the last two years) are considered to be more representative of current and future groundwater conditions than samples collected earlier. Summary statistics for groundwater data collected in 2004 through 2006 and presented in Table 3-5. This table shows minimum and maximum concentrations, the range of reporting limits, and the detection frequency for all detected constituents in groundwater. Similar statistics are also presented separately for data collected from 2001 to 2004 (Table 3-6). These statistics help show the variation in groundwater quality over time.

3.3.7 Selection of COPCs for Soil Gas

Soil gas samples were collected from depths of 2 feet bgs to 71 feet bgs in 1990, 1995, 1999, 2004, 2005, and 2006. Since the primary exposure pathway of concern is indoor air, only the more shallow gas samples, ~6 feet bgs, were used in the primary analysis. Because the site and surrounding parcels are almost completely paved, barometric pumping is not expected to be significant and soil gas collected at ~ 6 feet bgs soil gas is most appropriate for estimating indoor air concentrations. In addition, many soil gas samples were collected immediately adjacent to buildings to best characterize likely VOC concentrations beneath buildings.

The conclusion that shallow soil gas is representative for examining vapor intrusion is support by comparing concentrations from this depth interval with soil gas data from the depth interval for 5 to 6 feet (Table 3-7a) to 30 feet bgs (Table 3-8a). In almost all cases, the highest maximum and median soil gas concentrations for PCE, TCE and Freon 113 are observed in the shallow interval. These chemicals were selected because they are obviously site related and occur at the highest concentrations observed at the site. Further, as reported in Section 5, risk characterization, PCE and TCE are responsible for the highest risks estimated for the site. The only exceptions were for TCE (but not PCE) for the South parcel, and for all chemicals in the West parcel - Terrapave. In no case were concentrations of PCE or TCE in the deep interval greatly higher than in the shallow. For example, shallow and deep soil gas concentrations for PCE in the west parcel-TerraPave were 1,600,000 and 1,800,000 $\mu g/m^3$, respectively for shallow and deeper soil gas. The largest difference was observed for Freon 113 in the west parcel-TerraPave, 500,000 versus 1,500,000 $\mu g/m^3$ for shallow and deeper soil gas respectively. Freon is not, however, an important risk driver for the site. Relative concentrations of the two more important risk drivers for this parcel are similar for both depth intervals. Overall, use of shallow soil gas for quantitative analyses in this risk assessment appears to be a reasonable approach.

Also, because soil gas concentrations are likely to change over time, only the more recent soil gas samples (2004 to 2006) are included in the analysis. Soil gas samples were collected April 2004, November 2004, August 2005, December 2005, March 2006, May 2006. Soil vapor probes were installed using a direct push rig. Soil gas sampling and analysis were conducted in general accordance with the Advisory-Active Soil Gas Investigations dated January 28, 2003, jointly issued by the DTSC and the Los Angeles RWQCB (DTSC/LARWQCB Advisory). One-liter pre-cleaned and evacuated Summa ®canisters provided by a California- certified analytical laboratory were used to collect all soil vapor samples. Summa canisters were evacuated to 30 inches of mercury vacuum and a flow regulator was placed between the probe and the canister to ensure that the canister was filled at the appropriate flow rate of 200 milliliters per minute (ml/min).Following collection, Summa canisters were labeled with a laboratory-provided sample tag, and shipped to the analytical laboratory with a completed chain-of-custody form. Detailed descriptions of the soil vapor sampling events and sampling methodology are provided in Sections 3.1.3 and 3.3 of the RI report, respectively.

For the risk evaluation, soil gas data were divided into three categories:

- All Parcels – This category includes the Omega site parcel as well as the parcels to the north (Medlin & Sons), south (LA Carts and Oncology Care), south/west (Bishop Company), and west (TerraPave).

- Site Parcel - This category only includes the former Omega site parcel where Star City Auto Body and the Three Kings Construction are currently located.

- Other Parcels – This category includes the parcels to the north (Medlin & Sons), south (LA Carts and Oncology Care), south/west (Bishop Company), and west (TerraPave).

Tables 3-7a, 3-7b, and 3-7c summarize the 5 to 6-foot bgs data for All Parcels, Site Parcel, and Other Parcels. Tables 3-8a, 3-8b, and 3-8c summarize the 5 to 30-foot bgs data for All Parcels, Site Parcel, and Other Parcels. Since PCE and TCE are the primary chemicals of concern at the site, Figures 3-3 and 3-4 show soil vapor plumes depicting PCE and TCE soil gas CHHSL exceedances for samples collected from 0 to 6 feet bgs, respectively. Figures 3-5, 3-6, and 3-7 present soil vapor concentrations for samples collected 0 to 30 feet bgs for total VOCs, PCE, and TCE, respectively.

As noted in Section 3.1, historical soil gas data were determined to be of insufficient quality for the HHRA. Moreover, locations of more recent sampling not only suitably represented by more recently collected samples, the current data provide much more extensive characterization, especially in surrounding parcels. Thus, omission of these historical soil gas data is appropriate for this site. Please refer to the RI for further discussion of the historic soil gas data.

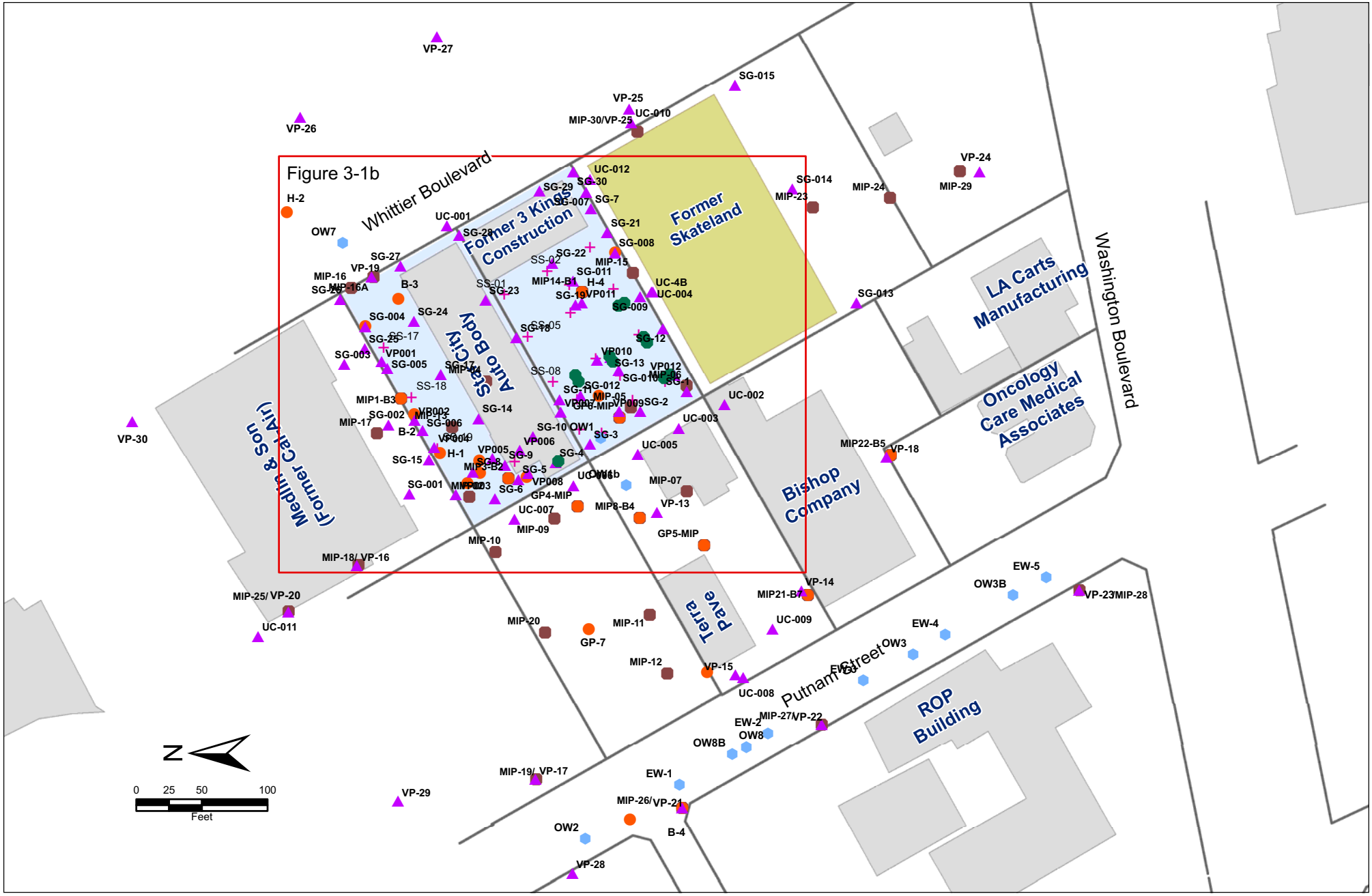
Measured indoor air data are used to evaluate all of the indoor air pathways for current scenarios for all of the buildings, except for the former Skateland facility because this building was demolished as of April 4, 2007. No houses currently exist onsite, therefore to estimate hypothetical future resident indoor air exposure, measured soil gas data ranging from 5 to 6-foot bgs for the Site Parcel and for Other Parcels summarized in Tables 3-7b and 3-7c were used in the J&E model to quantitatively evaluate this pathway for the hypothetical future resident and the future industrial worker. Measured soil gas data ranging from 5 to 30-foot bgs summarized in Tables 3-8a, 3-8b, and 3-8c were used in the J&E model to quantitatively evaluate the ambient air pathway for the construction scenario.

Because soil gas from deeper samples could in theory represent a source of VOCs at shallow depths, deeper soil gas samples, greater than 30 feet bgs, are presented in Table 3-9. These statistics help ensure that no detected constituent was overlooked in the shallower data. These deeper data were not used in the calculation of exposure point concentrations (Section 3.5).

3.3.8 Selection of COPCs for Indoor and Ambient Air

Indoor and ambient air samples were collected from May 2004 to September 2006. Sampling protocols, building surveys, and criteria used to choose indoor air sampling locations, and target analytes are described in the OSS RI Work Plan (CDM, 2003) and addenda (CDM 2004; 2005; 2006). Section 3.1.6 of the RI discusses locations and rationale for air sample locations. EPA reviewed and approved all sampling locations prior to sampling, and USEPA representatives were on-site during all indoor and ambient air sampling events to oversee and document sampling procedures and collect split samples. Since indoor air data are evaluated separately by building, summaries of indoor air data by building are provided in Tables 3-10 through 3-17.

Indoor air samples were collected from Medlin & Sons North Building, Oncology Care, LA Carts, and Bishop in September 2006; from Terrapave, Star City Autobody, Three Kings Construction, and Medlin & Sons in May 2004 and September 2005. Ambient air data are summarized in Table 3-18. Measured ambient air concentrations were only used qualitatively in the uncertainty analyses to provide a comparison to modeled ambient air exposure from soil gas.



DRAFT

CDM

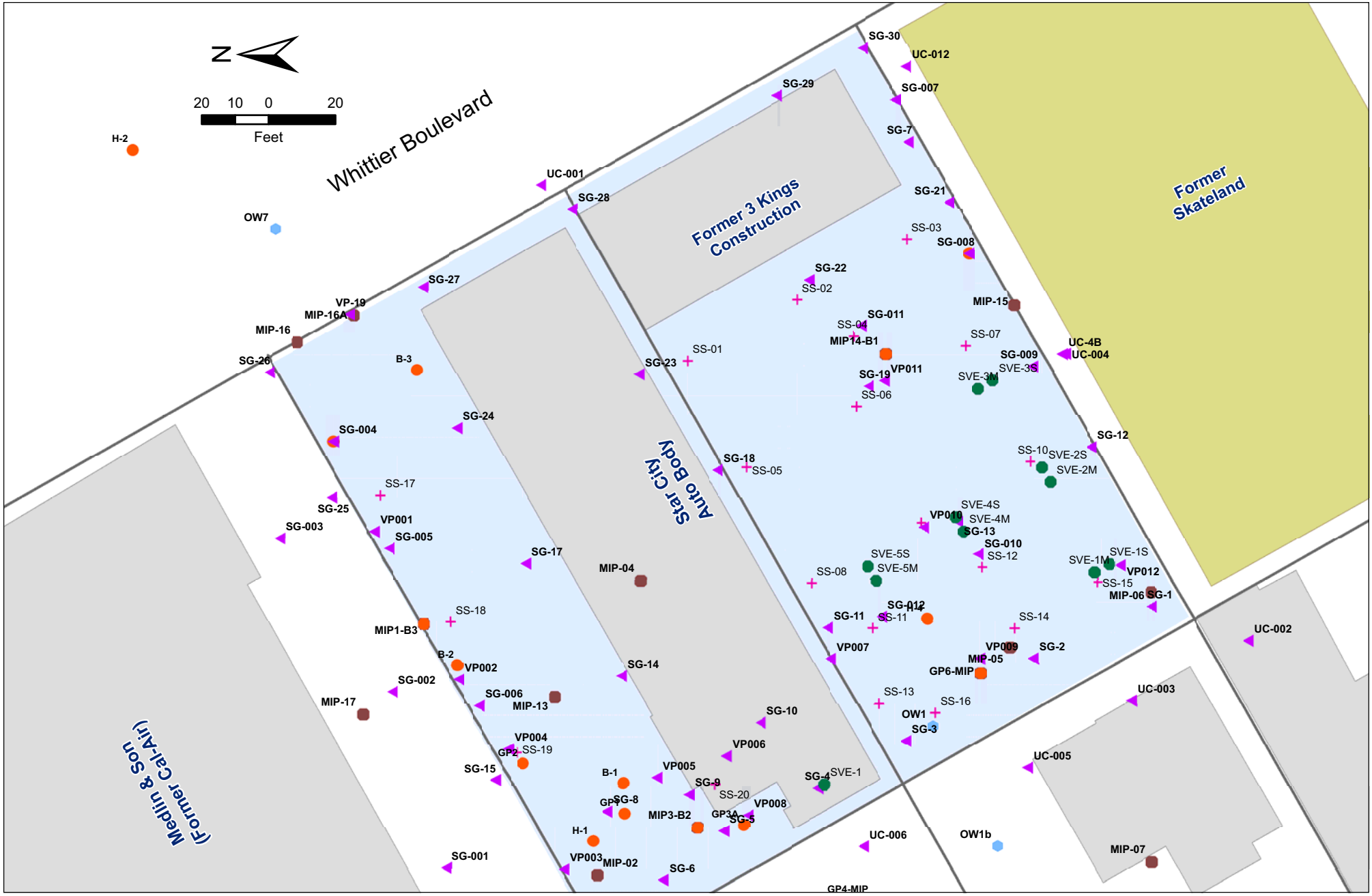
Legend

- Property Boundary
- Former Omega Chemical Property
- Existing Building
- Former Building
- Surface Soil Sample Location
- Subsurface Soil Sample Location
- Soil Vapor Sample Location
- Membrane Interface Probe (MIP)
- SoilVaporExtractionWells
- Groundwater Well Location

Omega Chemical

Sampling Locations

Figure 3-1



DRAFT

Legend

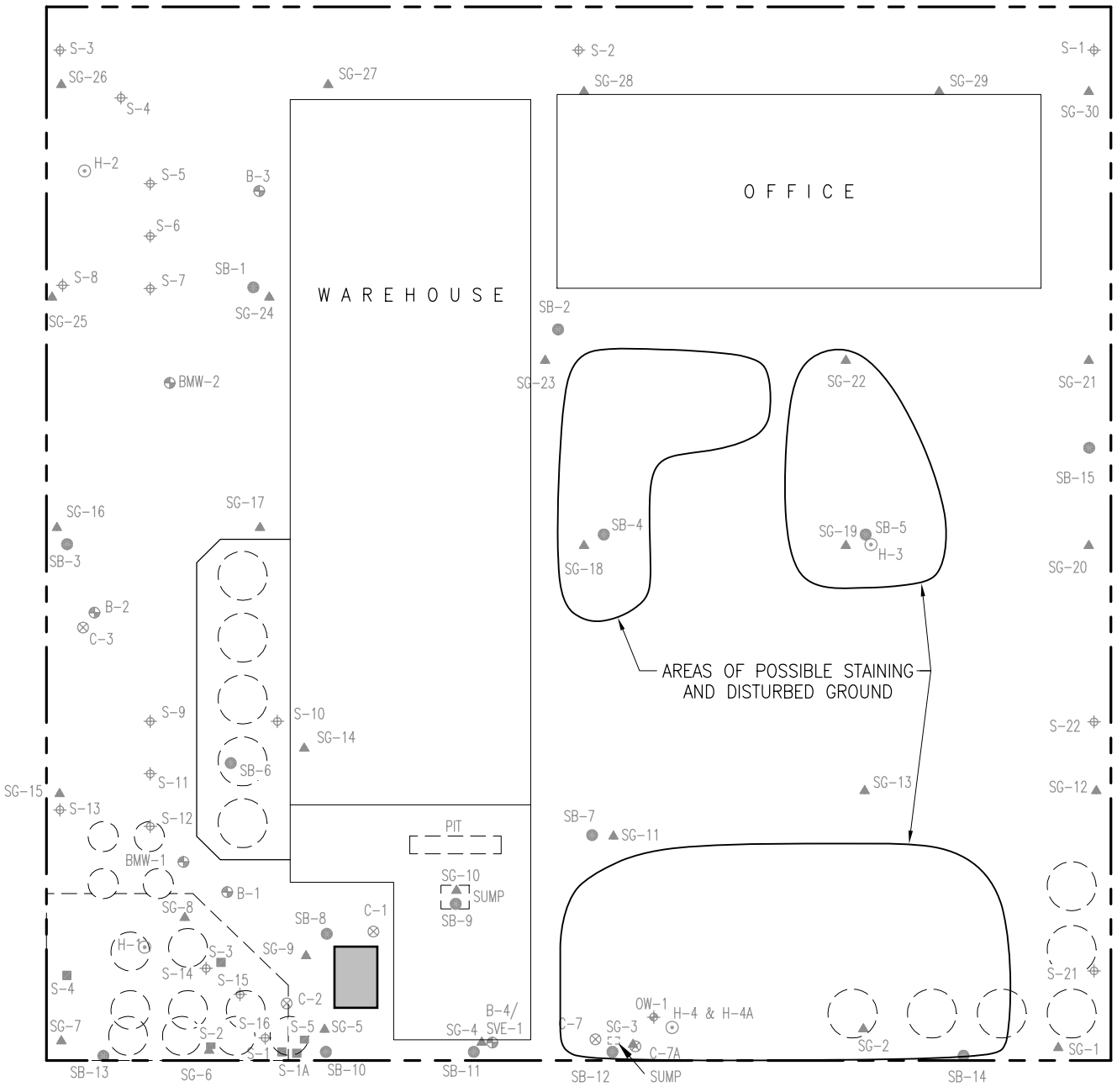
- Property Boundary
- Former Omega Chemical Property
- Existing Building
- Former Building
- Surface Soil Sample Location
- Subsurface Soil Sample Location
- Soil Vapor Sample Location
- Membrane Interface Probe (MIP)
- SoilVaporExtractionWells
- Groundwater Well Location

CDM

Omega Chemical

Sampling Locations (Inset)

Figure 3-1b



LEGEND

- Leroy Crandall Soil Boring (1985)
- ENSR Soil Boring (1988)
- ENSR Groundwater Monitoring Well (1988)
- England/Hargis Soil Boring (January 1996)
- England/Hargis Soil Gas Sample (December 1995)
- England/Hargis Monitoring Well (June 1996)
- England/Hargis Hydropunch (March 1996)
- England/Hargis Soil Boring (March 1996)
- ERT Soil Gas Sample (1988)
- Feature Removed

Fomer 500 Gallon UST Location

1" = 30'

15 0 30

Note: All locations approximate.

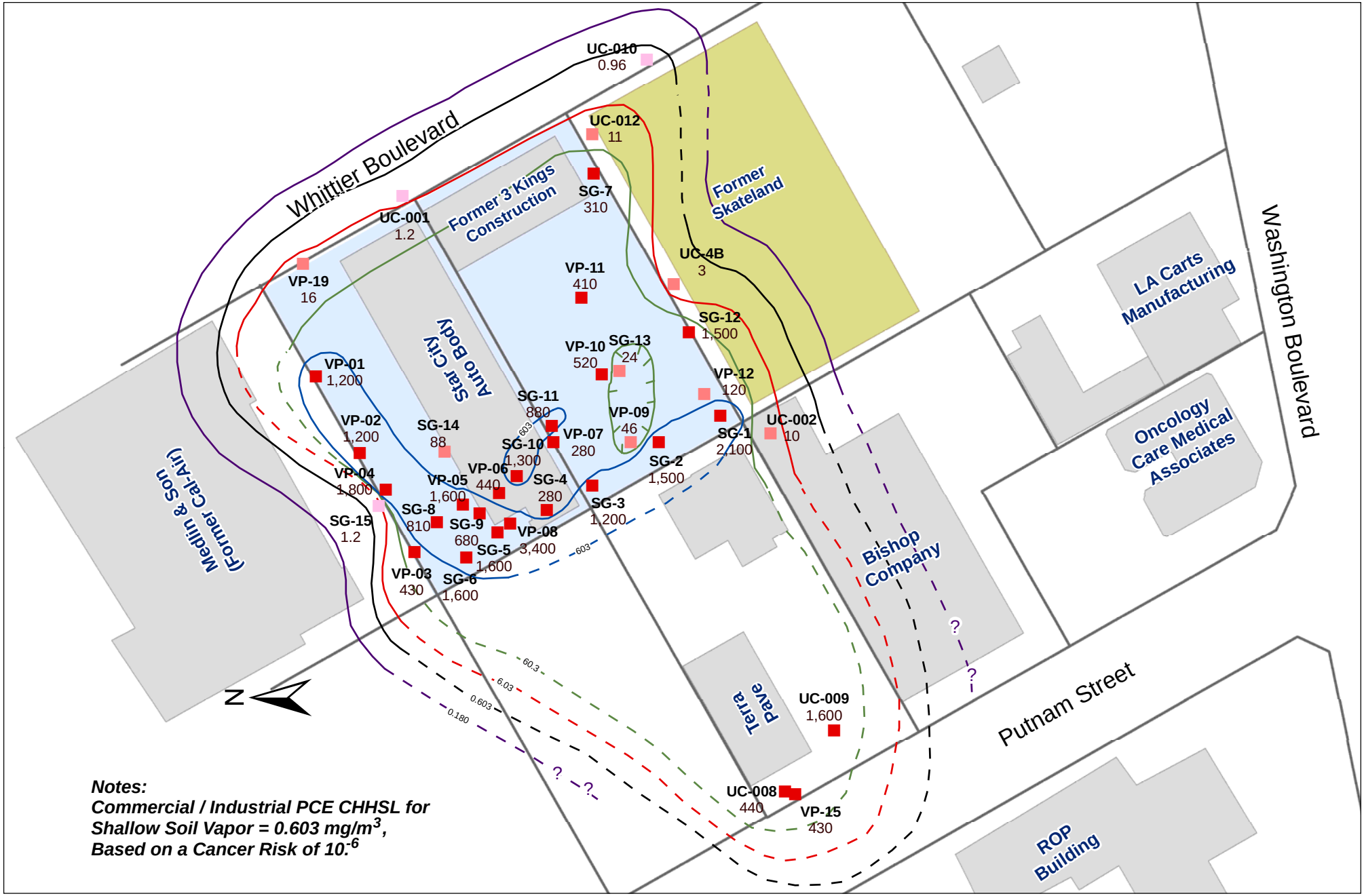
OMEGA CHEMICAL

Potential Source Areas And Historic Sample Locations

CDM

Figure 3-2

DATE: Dec 06, 2006 11:55am XREFS: PropSamp
DWG: C:\Documents and Settings\nguyens\Desktop\Omega\00-sheets\PSAO-HistPhot.dwg USER: nguyens



DRAFT

CDM

Legend

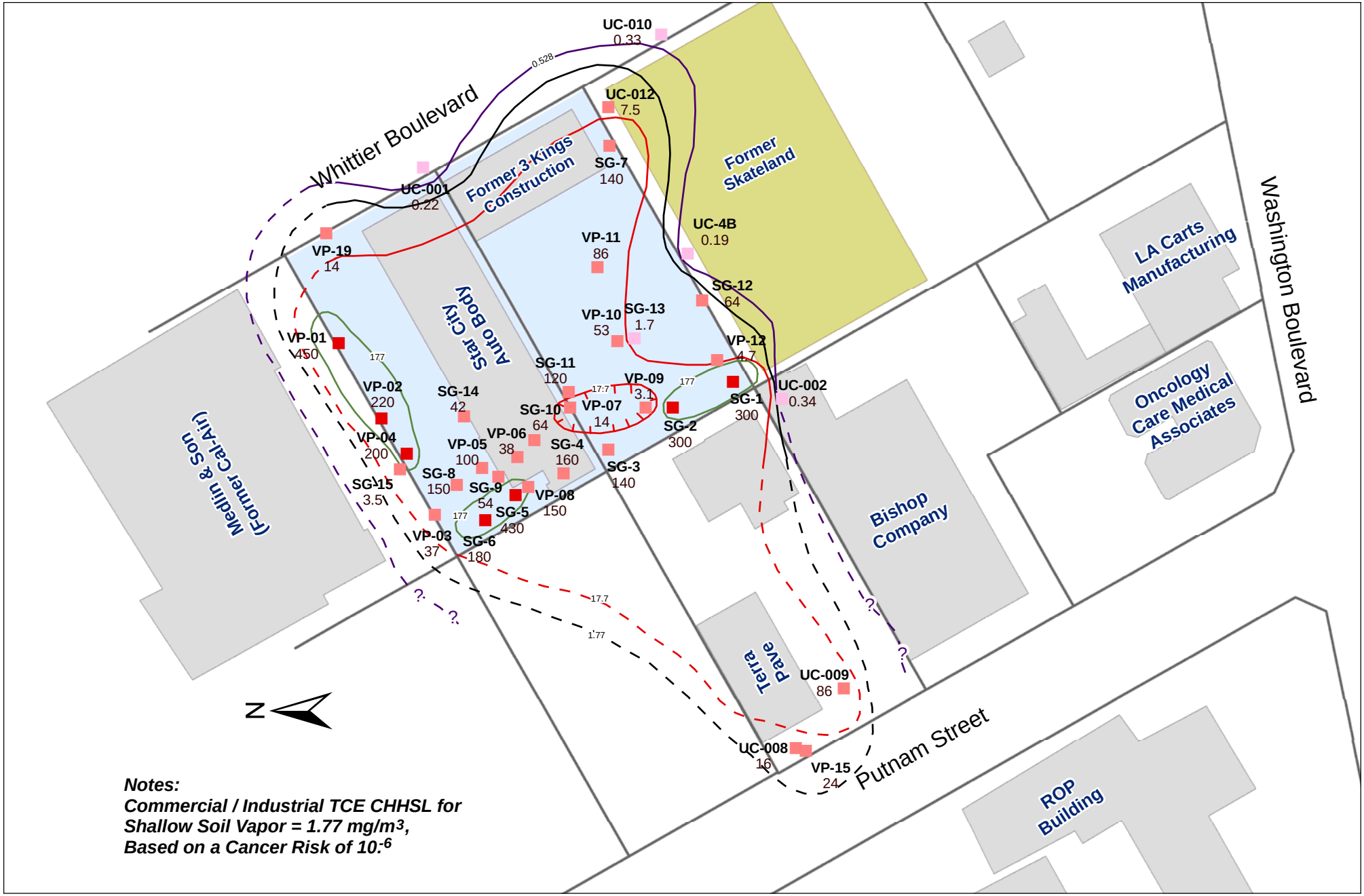
- Property Boundary
- Former Omega Chemical Property
- Building
- Not Detected
- < 0.603 mg/m3
- 0.603 - 60.3 mg/m3
- > 60.3 mg/m3

PCE (mg/m3)

- Residential CHHSL (0.180 mg/m3)
- Industrial / Commercial CHHSL (0.603 mg/m3)
- Industrial / Commercial CHHSL x 10 (6.03 mg/m3)
- Industrial / Commercial CHHSL x 100 (60.3 mg/m3)
- Industrial / Commercial CHHSL x 1,000 (603 mg/m3)

Dashed where inferred.

Omega Chemical
Locations with Soil Vapor PCE CHHSL Exceedances From 0 - 6 Feet
Figure 3-3



Notes:
Commercial / Industrial TCE CHHSL for Shallow Soil Vapor = 1.77 mg/m³, Based on a Cancer Risk of 10:-6

DRAFT

CDM

Legend

- Property Boundary
- Former Omega Chemical Property
- Building

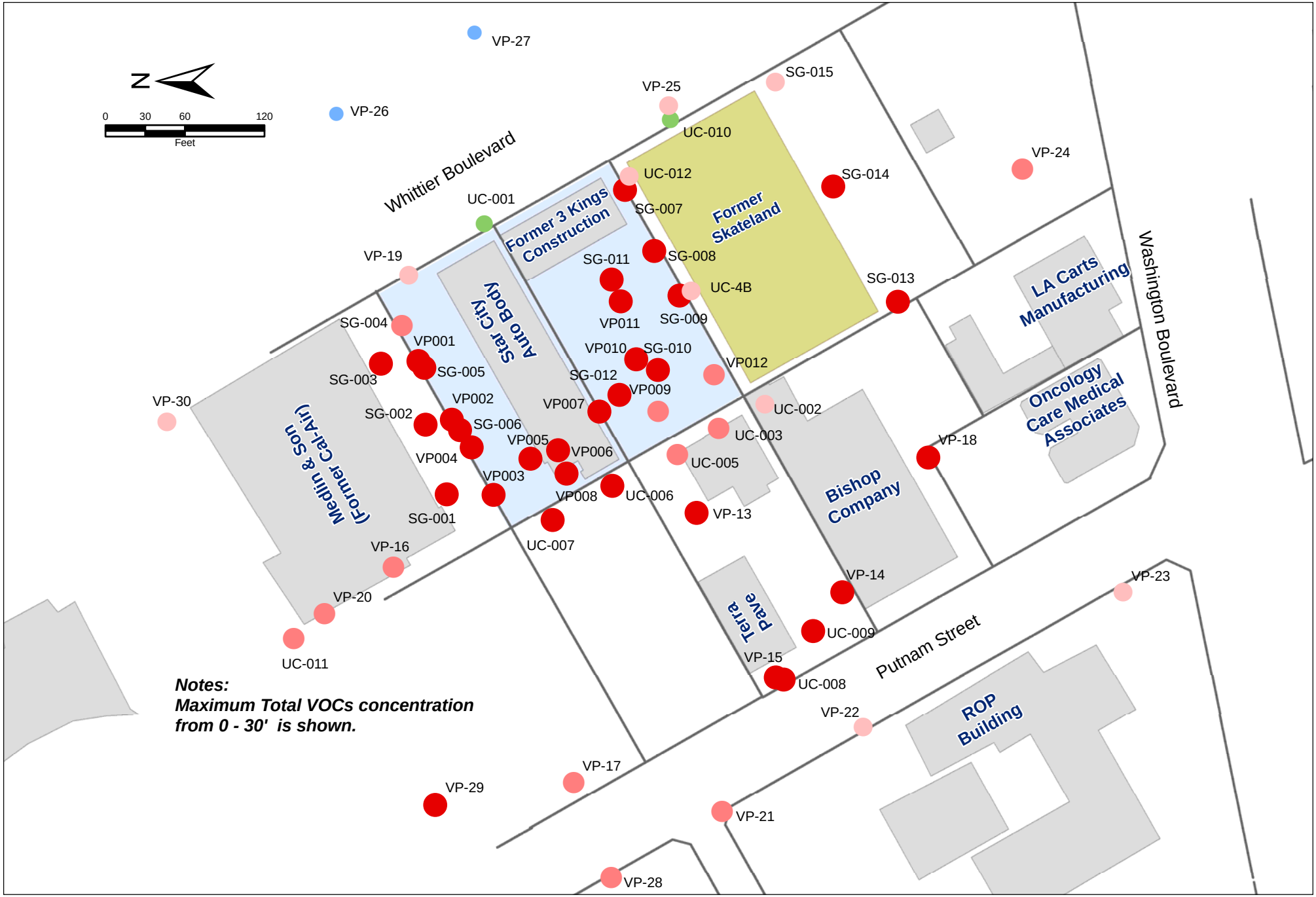
- Not Detected
- < 1.77 mg/m^3
- 1.77 - 177 mg/m^3
- > 177 mg/m^3

TCE (mg/m^3)

- Residential CHHSL (0.528 mg/m^3)
- Industrial / Commercial CHHSL (1.77 mg/m^3)
- Industrial / Commercial CHHSL x 10 (17.7 mg/m^3)
- Industrial / Commercial CHHSL x 100 (177 mg/m^3)

Dashed where inferred.

Omega Chemical
Locations with Soil Vapor TCE CHHSL Exceedances From 0 - 6 Feet
Figure 3-4



Notes:
Maximum Total VOCs concentration from 0 - 30' is shown.

DRAFT

CDM

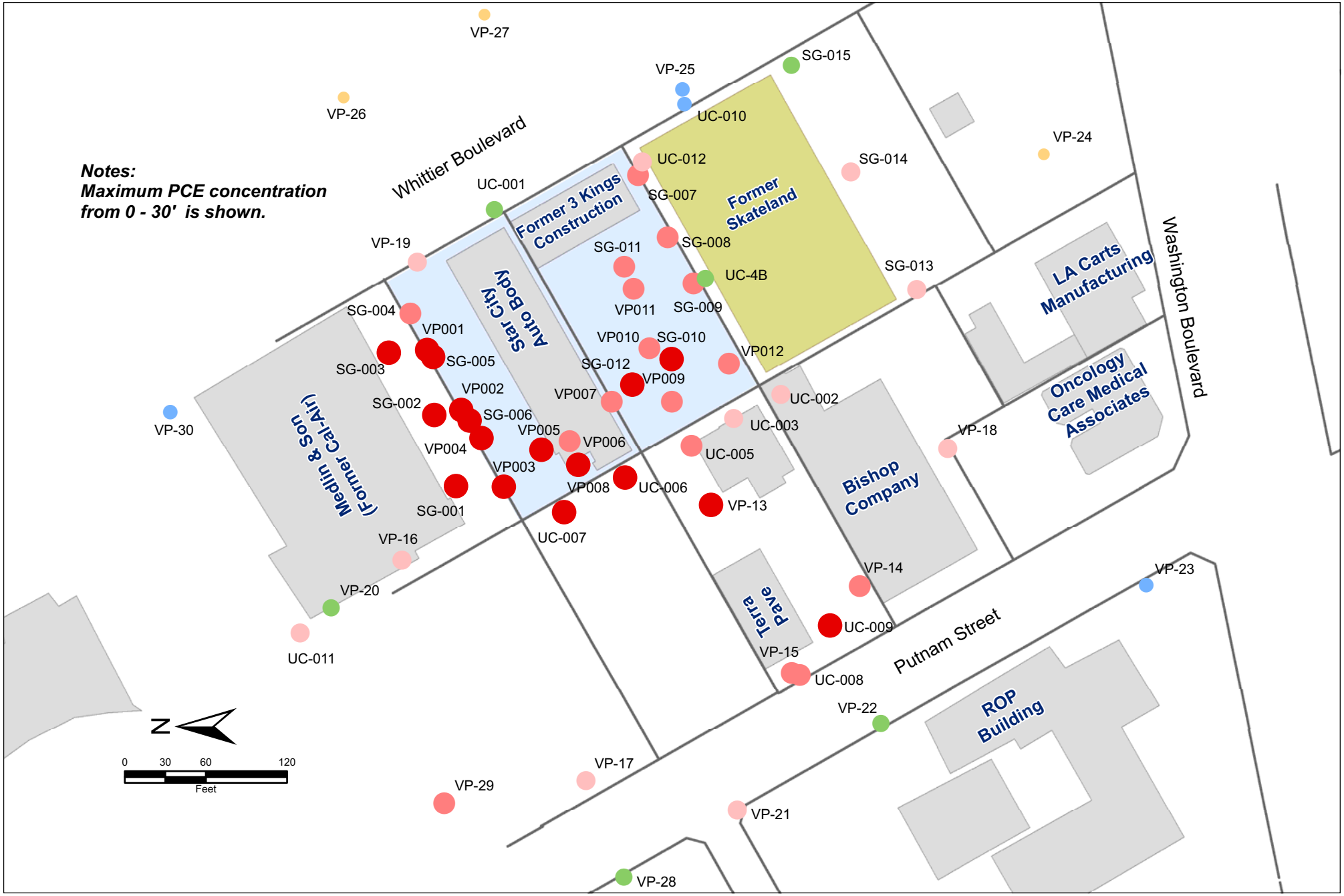
Legend

- Property Boundary
- Former Omega Chemical Property
- Existing Building
- Former Building

Total VOCs (mg/m^3)

- ND - 0.1
- 0.1 - 1
- 1 - 10
- 10 - 100
- 100 - 1,000
- 1,000 - 10,000
- > 10,000

Omega Chemical
Soil Vapor Concentrations (0 - 30 feet)
Total VOCs
Figure 3-5



DRAFT

CDM

Legend

- Property Boundary
- Former Omega Chemical Property
- Existing Building
- Former Building

PCE (mg/m^3)

- ND - 0.1
- 0.1 - 1
- 1 - 10
- 10 - 100
- 100 - 1,000
- 1,000 - 10,000
- > 10,000

Omega Chemical

Soil Vapor Concentrations (0 - 30 feet)
Tetrachloroethene (PCE)
Figure 3-6

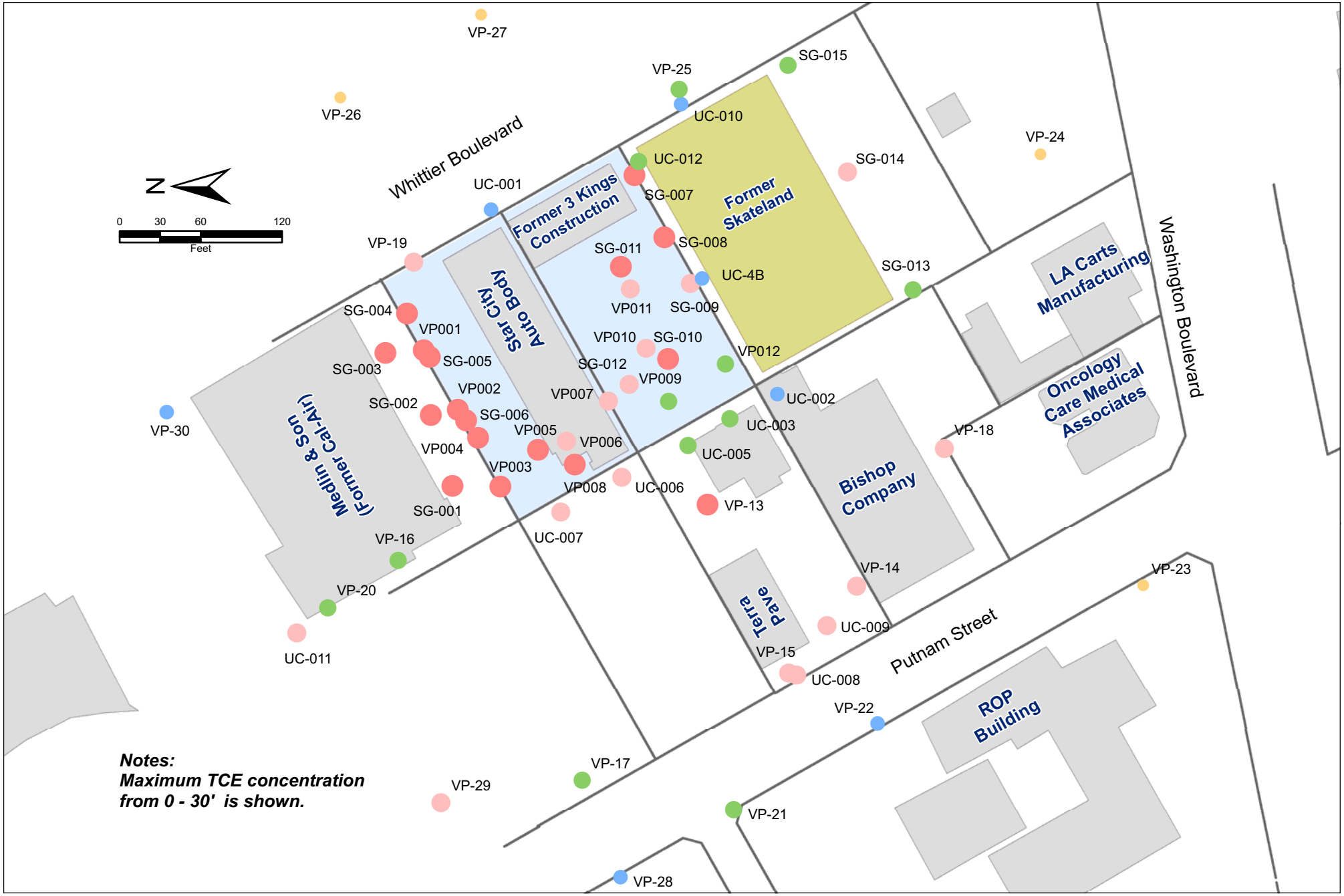

VP-27
VP-25
SG-015
VP-26
UC-010
VP-24
UC-012
SG-014
Whittier Boulevard
UC-001
SG-007
Former Skateland
Former 3 Kings Construction
SG-008
VP-19
SG-011
SG-013
UC-4B
LA Carts Manufacturing
Washington Boulevard
VP011
SG-009
SG-004
VP001
Star City Auto Body
VP010
SG-010
VP012
SG-003
SG-005
SG-012
VP009
VP002
VP007
UC-002
SG-002
SG-006
UC-003
VP-18
Oncology Care Medical Associates
VP-30
VP005
VP006
UC-005
VP004
VP003
Bishop Company
VP008
UC-006
VP-13
SG-001
UC-007
Medlin & Son (Former Cal-Air)
VP-16
VP-14
VP-23
VP-20
Terra Pave
UC-009
UC-011
VP-15
Putnam Street
UC-008
VP-22
ROP Building
VP-17
VP-29
VP-21
VP-28
N
0 30 60 120
Feet
Notes:
Maximum TCE concentration from 0 - 30' is shown.
DRAFT
CDM
Legend
Property Boundary
Former Omega Chemical Property
Existing Building
Former Building
TCE (mg/m3)
ND - 0.1
0.1 - 1
1 - 10
10 - 100
100 - 1,000
1,000 - 10,000
> 10,000
Omega Chemical
Soil Vapor Concentrations (0 - 30 feet)
Trichloroethene (TCE)
Figure 3-7

TABLE 3-1
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - Surface Soil
Omega Chemical Site - Whittier, California

Scenario Timeframe:	Current
Medium:	Surface Soil 0' to 2.2'
Exposure Medium:	Surface Soil 0' to 2.2'

Exposure Point	CAS Number	Chemical	Minimum Concentration	Maximum Concentration	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits (1)	Concentration Used for Screening (2)	Background Value (3)	Screening Toxicity Value (nc/ca) (4)	Potential ARAR/TBC Value	Potential ARAR/TBC Source (5)	COPC Flag (Y/N)	Rationale for Selection or Deletion (5)
Surface Soil															
	95-50-1	1,2-DICHLOROBENZENE	0.083	0.24	mg/kg	SS-20	2 / 34	0.09 - 8	0.24	NA	6.0E+01 sat			Yes	FD
	123-91-1	1,4-DIOXANE	0.014	14	mg/kg	SS-20	10 / 19	0.03 - 0.2	14	NA	1.6E+01 ca			Yes	FD
	91-57-6	2-METHYLNAPHTHALENE	0.48	0.54	mg/kg	SB-15	2 / 36	0.09 - 8	0.54	NA				Yes	FD
	72-54-8	4,4'-DDD	0.0015	0.032	mg/kg	SS-15	3 / 36	0.005 - 8.005	0.032	NA	1.0E+00 ca			Yes	FD
	72-55-9	4,4'-DDE	0.001	0.3	mg/kg	SS-15	8 / 36	0.005 - 8	0.3	NA	7.0E-01 ca			Yes	FD
	50-29-3	4,4'-DDT	0.0017	0.15	mg/kg	SS-16	10 / 36	0.005 - 8	0.15	NA	7.0E-01 ca*			Yes	FD
	7429-90-5	ALUMINUM	9410	9830	mg/kg	SS-12	2 / 2	NR - NR	9830	NA	1.0E+04 max			Yes	FD
	7440-36-0	ANTIMONY	0.6	18	mg/kg	SB-13	10 / 36	10 - 10	18	NA	4.1E+01 nc			Yes	FD
	7440-38-2	ARSENIC	1.4	21	mg/kg	SS-01	36 / 36	1 - 1	21	NA	2.5E-02 ca			No	STAT
	7440-39-3	BARIUM	38	230	mg/kg	SB-13	36 / 36	1 - 1	230	NA	6.7E+03 nc			Yes	FD
	56-55-3	BENZO(A)ANTHRACENE	0.032	2.4	mg/kg	SB-15	2 / 34	0.09 - 8	2.4	NA	2.1E-01 ca			Yes	FD
	50-32-8	BENZO(A)PYRENE	1.6	1.6	mg/kg	SB-15	1 / 34	0.09 - 8	1.6	NA	2.1E-02 ca			Yes	ASL
	205-99-2	BENZO(B)FLUORANTHENE	0.91	0.91	mg/kg	SB-15	1 / 34	0.09 - 8	0.91	NA	2.1E-01 ca			Yes	ASL
	191-24-2	BENZO(G,H,I)PERYLENE	0.49	0.49	mg/kg	SB-15	1 / 34	0.09 - 8	0.49	NA				No	NTX1
	100-51-6	BENZYL ALCOHOL (PHENYLMETHANOL)	5.2	5.2	mg/kg	SB-09	1 / 34	0.09 - 8	5.2	NA	1.0E+04 max			No	IFD1
	7440-41-7	BERYLLIUM	0.18	0.75	mg/kg	SB-12	36 / 36	1 - 1	0.75	NA	1.9E+02 ca**			Yes	FD
	117-81-7	BIS(2-ETHYLHEXYL)PHTHALATE	0.03	51	mg/kg	SS-20	11 / 34	0.2 - 20	51	NA	1.2E+01 ca			Yes	FD
	85-68-7	BUTYLBENZYL PHTHALATE	0.85	1.9	mg/kg	SS-01	2 / 34	0.09 - 8	1.9	NA	1.0E+04 max			Yes	FD
	7440-43-9	CADMIUM	0.25	2.1	mg/kg	SS-04, SS-07	23 / 36	1 - 1	2.10	NA	4.5E+01 nc			Yes	FD
	7440-23-5	CALCIUM	5910	7170	mg/kg	SS-12	2 / 2	NR - NR	7170.0	NA				No	NUT
	16065-83-1	CHROMIUM III	7.03	308.571	mg/kg	SS-09	36 / 36	1 - 1	308.6	NA	1.0E+04 max			Yes	FD
	18540-29-9	CHROMIUM VI	1.17	51.4286	mg/kg	SS-09	36 / 36	1 - 1	51.4	NA	6.4E+00 ca			Yes	FD
	218-01-9	CHRYSENE	0.038	6	mg/kg	SB-15	2 / 34	0.09 - 8	6	NA	2.1E+01 ca			Yes	FD
	7440-48-4	COBALT	4.7	16	mg/kg	SB-12	36 / 36	5 - 5	16	NA	1.9E+02 ca*			Yes	FD
	7440-50-8	COPPER	13	150	mg/kg	SB-12	36 / 36	2 - 2	150	NA	4.1E+03 nc			Yes	FD
	60-57-1	DIELDRIN	0.0084	0.05	mg/kg	SS-15	2 / 36	0.005 - 8.005	0.05	NA	1.1E-02 ca			Yes	FD
	84-66-2	DIETHYL PHTHALATE	0.037	0.037	mg/kg	SS-14	1 / 34	0.09 - 8	0	NA	1.0E+04 max			No	IFD1
	84-74-2	DI-N-BUTYLPHTHALATE	0.33	0.33	mg/kg	SS-20	1 / 34	0.09 - 8	0.3	NA	6.2E+03 nc			No	IFD1
	117-84-0	DI-N-OCTYL PHTHALATE (DIOCTYL PHTHALATE)	0.24	0.24	mg/kg	SB-11	1 / 34	0.09 - 8	0.24	NA	2.5E+03 nc			No	IFD1
	72-20-8	ENDRIN	0.032	0.032	mg/kg	SS-15	1 / 36	0.005 - 20.01	0.032	NA	1.8E+01 nc			No	IFD1
	206-44-0	FLUORANTHENE (IDRYL)	0.033	0.66	mg/kg	SB-15	2 / 34	0.09 - 8	0.66	NA	2.2E+03 nc			Yes	FD
	7439-89-6	IRON	22100	23300	mg/kg	SS-04	2 / 2	NR - NR	23300	NA	1.0E+04 max			Yes	FD
	78-59-1	ISOPHORONE	0.54	9.9	mg/kg	SB-09	2 / 36	0.09 - 8	9.9	NA	5.1E+01 ca*			Yes	FD
	7439-92-1	LEAD	5	890	mg/kg	SB-12	36 / 36	5 - 5	890	NA	8.0E+01 nc			Yes	FD
	7439-95-4	MAGNESIUM	5190	5590	mg/kg	SS-04	2 / 2	NR - NR	5590	NA				No	NUT

TABLE 3-1
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - Surface Soil
Omega Chemical Site - Whittier, California

Scenario Timeframe:	Current
Medium:	Surface Soil 0' to 2.2'
Exposure Medium:	Surface Soil 0' to 2.2'

Exposure Point	CAS Number	Chemical	Minimum Concentration	Maximum Concentration	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits (1)	Concentration Used for Screening (2)	Background Value (3)	Screening Toxicity Value (nc/ca) (4)	Potential ARAR/TBC Value	Potential ARAR/TBC Source (5)	COPC Flag (Y/N)	Rationale for Selection or Deletion (5)
	7439-96-5	MANGANESE	193	353	mg/kg	SS-12	2 / 2	NR - NR	353	NA	1.9E+03 nc			Yes	FD
	7487-94-7	MERCURY	0.029	0.85	mg/kg	SS-01	22 / 36	0.2 - 0.2	0.85	NA	3.1E+01 nc			Yes	FD
	7439-98-7	MOLYBDENUM	1.5	4.2	mg/kg	SB-13	14 / 34	5 - 5	4.2	NA	5.1E+02 nc			Yes	FD
	91-20-3	NAPHTHALENE	1.2	1.2	mg/kg	SS-20	1 / 36	0.09 - 8	1.2	NA	4.2E-01 ca			Yes	ASL
	7440-02-0	NICKEL	7.5	55	mg/kg	SB-12	36 / 36	1 - 1	55	NA	2.0E+03 nc			Yes	FD
	11097-69-1	PCB-1254 (AROCLOR 1254)	0.21	0.5	mg/kg	SS-16	2 / 36	0.01 - 0.05	0.5	NA	7.4E-02 ca*			Yes	FD
	85-01-8	PHENANTHRENE	0.013	5	mg/kg	SB-15	3 / 34	0.09 - 8	5	NA				Yes	FD
	12674-11-2	POLYCHLORINATED BI PHENYLS, TOTAL	0.5	0.5	mg/kg	SS-16	1 / 20	0.01 - 0.02	0.5	NA	2.1E+00 ca**			Yes	FD
	7440-09-7	POTASSIUM	4330	4520	mg/kg	SS-12	2 / 2	NR - NR	4520	NA				No	NUT
	129-00-0	PYRENE	0.018	3.1	mg/kg	SB-15	3 / 34	0.09 - 8	3.1	NA	2.9E+03 nc			Yes	FD
	7440-22-4	SILVER	0.55	1.2	mg/kg	SS-06	3 / 36	1 - 1	1.2	NA	5.1E+02 nc			Yes	FD
	7440-23-5	SODIUM	290	324	mg/kg	SS-04	2 / 2	NR - NR	324	NA				No	NUT
	7440-28-0	THALLIUM	0.9	2	mg/kg	SS-06, SS-07, SS-08, SS-13	14 / 36	10 - 10	2	NA	6.7E+00 nc			Yes	FD
	7440-62-2	VANADIUM	20	71	mg/kg	SB-05	36 / 36	1 - 1	71	NA	1.0E+02 nc			Yes	FD
	7440-66-6	ZINC	34	350	mg/kg	SB-12	36 / 36	5 - 5	350	NA	1.0E+04 max			Yes	FD

(1) Detection limits for detected chemicals in historical data were not available.
(2) Maximum detected concentration used for screening.
(3) Maximum detected background concentration.
(4) Screened against 1/10th EPA's Region 9 Preliminary Remediation Goals (PRGs) for industrial soil (EPA 2004c) to account for additivity of multiple chemcials.
(5) Not available.
(6) Chromium concentrations were divided between Chromium III and Chromium VI assuming a 1:6 ratio of Cr VI:Cr III
(7) Rationale Codes:

Selection Reason:
- ASL: Above Screening Level
- TOX: Chemical is a Class A Carcinogen
- DET: Relatively few chemicals detected at site, so comparison with screening levels and frequency of detection were not used to eliminate COPCs
- NSL: No Screening Level
- FD: Frequent Detection
- CARC: Infrequent Detection but Chemical is a Carcinogen

Deletion Reason:
- BSL: Below Screening Level
- BSL1: Infrequent Detection and Below Screening Level
- NUT: Essential Nutrient
- NTX: No Toxicity Information Available
- NTX1: Infrequent Detection and No Toxicity Information Available
- IFD: Infrequent Detection
- IFD1: Infrequent Detection and Below Screening Level
- STAT: Not a site contaminant according to separate statistical analysis, see text

Definitions:
- NA: Not Available.
- ND: Not Detected.
- nc: Screening Toxicity Value is based on noncancer effects.
- ca: Screening Toxicity Value is based on cancer effects.
- COPC: Chemical of Potential Concern.
- ARAR/TBC: Applicable or Relevant and Appropriate Requirement/To Be Considered.
- VOCs: Volatile Organic Compounds.
- ug/kg: microgram per kilogram.
- ca*: where: nc PRG < 100X ca PRG
- ca**: where nc PRG < 10X ca PRG

TABLE 3-2
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - Surface and Subsurface Soil to 12 feet bgs
Omega Chemical Site - Whittier, California

Scenario Timeframe:	Future
Medium:	Surface & Subsurface Soil to 12'
Exposure Medium:	Surface & Subsurface Soil to 12'

Exposure Point	CAS Number	Chemical	Minimum Concentration	Maximum Concentration	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits (1)	Concentration Used for Screening (2)	Background Value (3)	Screening Toxicity Value (nc/ca) (4)	Potential ARAR/TBC Value	Potential ARAR/TBC Source (5)	COPC Flag (Y/N)	Rationale for Selection or Deletion (5)
Subsurface Soil															
	71-55-6	1,1,1-TRICHLOROETHANE	0.047	0.047	mg/kg	MIP3-B2	1 / 2	0.00084 - 0.085	0.047	NA	1.2E+02 sat			Yes	FD
	79-00-5	1,1,2-TRICHLOROETHANE	0.0034	0.0034	mg/kg	MIP3-B2	1 / 2	0.0008 - 0.085	0.0034	NA	1.6E-01 ca*			Yes	FD
	75-34-3	1,1-DICHLOROETHANE	0.0084	0.0084	mg/kg	MIP3-B2	1 / 2	0.0008 - 0.085	0.0084	NA	6.0E-01 ca			Yes	FD
	75-35-4	1,1-DICHLOROETHENE	0.0039	0.0039	mg/kg	MIP3-B2	1 / 2	0.0008 - 0.21	0.0039	NA	4.1E+01 nc			Yes	FD
	95-50-1	1,2-DICHLOROBENZENE	0.00088	0.24	mg/kg	SS-20	3 / 40	0.00084 - 8	0.24	NA	6.0E+01 sat			Yes	FD
	107-06-2	1,2-DICHLOROETHANE	0.0063	0.0063	mg/kg	MIP3-B2	1 / 2	0.0008 - 0.085	0.0063	NA	6.0E-02 ca*			Yes	FD
	106-46-7	1,4-DICHLOROBENZENE	0.0016	0.0016	mg/kg	MIP3-B2	1 / 40	0.0008 - 8	0.0016	NA	7.9E-01 ca			No	IFD1
	123-91-1	1,4-DIOXANE	0.014	28	mg/kg	MIP3-B2	12 / 21	0.03 - 2.5	28	NA	1.6E+01 ca			Yes	FD
	91-57-6	2-METHYLNAPHTHALENE	0.48	0.54	mg/kg	SB-15	2 / 40	0.09 - 8	0.54	NA				Yes	FD
	72-54-8	4,4'-DDD	0.0015	0.032	mg/kg	SS-15	3 / 60	0.005 - 8.005	0.032	NA	1.0E+00 ca			Yes	FD
	72-55-9	4,4'-DDE	0.001	0.3	mg/kg	SS-15	8 / 60	0.005 - 8	0.3	NA	7.0E-01 ca			Yes	FD
	50-29-3	4,4'-DDT	0.0017	0.15	mg/kg	SS-16	10 / 60	0.005 - 8	0.15	NA	7.0E-01 ca*			Yes	FD
	7429-90-5	ALUMINUM	9410	9830	mg/kg	SS-12	2 / 2	NR - NR	9830	NA	1.0E+04 max			Yes	FD
	7440-36-0	ANTIMONY	0.6	18	mg/kg	SB-13	10 / 40	10 - 10	18	NA	4.1E+01 nc			Yes	FD
	7440-38-2	ARSENIC	0.81	21	mg/kg	SS-01	40 / 40	1 - 1	21	NA	2.5E-02 ca			No	STAT
	7440-39-3	BARIUM	28	230	mg/kg	SB-13	40 / 40	1 - 1	230	NA	6.7E+03 nc			Yes	FD
	56-55-3	BENZO(A)ANTHRACENE	0.032	2.4	mg/kg	SB-15	2 / 38	0.09 - 8	2.4	NA	2.1E-01 ca			Yes	FD
	50-32-8	BENZO(A)PYRENE	1.6	1.6	mg/kg	SB-15	1 / 38	0.09 - 8	1.6	NA	2.1E-02 ca			Yes	ASL
	205-99-2	BENZO(B)FLUORANTHENE	0.91	0.91	mg/kg	SB-15	1 / 38	0.09 - 8	0.91	NA	2.1E-01 ca			Yes	ASL
	191-24-2	BENZO(G,H,I)PERYLENE	0.49	0.49	mg/kg	SB-15	1 / 38	0.09 - 8	0.49	NA				No	NTX1
	100-51-6	BENZYL ALCOHOL (PHENYLMETHANOL)	5.2	22	mg/kg	SB-09	2 / 38	0.09 - 8	22	NA	1.0E+04 max			Yes	FD
	7440-41-7	BERYLLIUM	0.18	0.75	mg/kg	SB-12	40 / 40	1 - 1	0.75	NA	1.9E+02 ca**			Yes	FD
	117-81-7	BIS(2-ETHYLHEXYL)PHTHALATE	0.03	51	mg/kg	SS-20	13 / 38	0.2 - 20	51	NA	1.2E+01 ca			Yes	FD
	85-68-7	BUTYLBENZYL PHTHALATE	0.85	1.9	mg/kg	SS-01	2 / 38	0.09 - 8	1.9	NA	1.0E+04 max			Yes	FD
	7440-43-9	CADMIUM	0.25	2.1	mg/kg	SS-04, SS-07	23 / 40	1 - 1	2.1	NA	4.5E+01 nc			Yes	FD
	7440-23-5	CALCIUM	5910	7170	mg/kg	SS-12	2 / 2	0 - 0	7170	NA				No	NUT
	67-66-3	CHLOROFORM	0.0047	0.0047	mg/kg	MIP3-B2	1 / 2	0.0008 - 0.085	0.0047	NA	2.0E-01 ca			Yes	FD
	16065-83-1	CHROMIUM III	4.8	308.571	mg/kg	SS-09	40 / 40	1 - 1	309	NA	1.0E+04 max			Yes	FD
	18540-29-9	CHROMIUM VI	0.8	51.4286	mg/kg	SS-09	40 / 40	1 - 1	51	NA	6.4E+00 ca			Yes	FD
	218-01-9	CHRYSENE	0.038	6	mg/kg	SB-15	2 / 38	0.09 - 8	6	NA	2.1E+01 ca			Yes	FD
	7440-48-4	COBALT	4.7	16	mg/kg	SB-12	39 / 40	5 - 5	16	NA	1.9E+02 ca*			Yes	FD
	7440-50-8	COPPER	13	150	mg/kg	SB-12	40 / 40	2 - 2	150	NA	4.1E+03 nc			Yes	FD
	60-57-1	DIELDRIN	0.0084	0.05	mg/kg	SS-15	2 / 60	0.005 - 8.005	0.05	NA	1.1E-02 ca			Yes	ASL
	84-66-2	DIETHYL PHTHALATE	0.037	0.037	mg/kg	SS-14	1 / 38	0.09 - 8	0.037	NA	1.0E+04 max			No	IFD1
	84-74-2	DI-N-BUTYLPHTHALATE	0.33	0.33	mg/kg	SS-20	1 / 38	0.09 - 8	0.33	NA	6.2E+03 nc			No	IFD1
	117-84-0	DI-N-OCTYL PHTHALATE (DIOCTYL PHTHALATE)	0.24	0.24	mg/kg	SB-11	1 / 38	0.09 - 8	0.24	NA	2.5E+03 nc			No	IFD1
	72-20-8	ENDRIN	0.032	0.032	mg/kg	SS-15	1 / 60	0.005 - 20.01	0.032	NA	1.8E+01 nc			No	IFD1
	206-44-0	FLUORANTHENE (IDRYL)	0.033	0.66	mg/kg	SB-15	2 / 38	0.09 - 8	0.66	NA	2.2E+03 nc			Yes	FD
	7439-89-6	IRON	22100	23300	mg/kg	SS-04	2 / 2	NR - NR	23300	NA	1.0E+04 max			Yes	FD
	78-59-1	ISOPHORONE	0.54	9.9	mg/kg	SB-09	3 / 40	0.09 - 8	9.9	NA	5.1E+01 ca*			Yes	FD
	7439-92-1	LEAD	5	890	mg/kg	SB-12	39 / 40	5 - 5	890	NA	8.0E+01 nc			Yes	FD
	7439-95-4	MAGNESIUM	5190	5590	mg/kg	SS-04	2 / 2	NR - NR	5590	NA				No	NUT
	7439-96-5	MANGANESE	193	353	mg/kg	SS-12	2 / 2	NR - NR	353	NA	1.9E+03 nc			Yes	FD
	7487-94-7	MERCURY	0.029	0.85	mg/kg	SS-01	22 / 40	0.2 - 0.2	0.85	NA	3.1E+01 nc			Yes	FD
	7439-98-7	MOLYBDENUM	1.5	4.2	mg/kg	SB-13	17 / 38	5 - 5	4.2	NA	5.1E+02 nc			Yes	FD
	91-20-3	NAPHTHALENE	1.2	1.2	mg/kg	SS-20	1 / 42	0.0084 - 8	1.2	NA	4.2E-01 ca			Yes	ASL
	7440-02-0	NICKEL	4.9	55	mg/kg	SB-12	40 / 40	1 - 1	55	NA	2.0E+03 nc			Yes	FD
	11097-69-1	PCB-1254 (AROCLOR 1254)	0.052	0.5	mg/kg	SS-16	3 / 40	NR - NR	0.5	NA	7.4E-02 ca*			Yes	FD

TABLE 3-2
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - Surface and Subsurface Soil to 12 feet bgs
Omega Chemical Site - Whittier, California

Scenario Timeframe:	Future
Medium:	Surface & Subsurface Soil to 12'
Exposure Medium:	Surface & Subsurface Soil to 12'

Exposure Point	CAS Number	Chemical	Minimum Concentration	Maximum Concentration	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits (1)	Concentration Used for Screening (2)	Background Value (3)	Screening Toxicity Value (nc/ca) (4)	Potential ARAR/TBC Value	Potential ARAR/TBC Source (5)	COPC Flag (Y/N)	Rationale for Selection or Deletion (5)
	85-01-8	PHENANTHRENE	0.013	5	mg/kg	SB-15	3 / 38	NR - NR	5	NA				Yes	FD
	12674-11-2	POLYCHLORINATED BI PHENYLS, TOTAL	0.5	0.5	mg/kg	SS-16	1 / 20	0.01 - 0.05	0.5	NA	2.1E+00 ca**			Yes	FD
	7440-09-7	POTASSIUM	4330	4520	mg/kg	SS-12	2 / 2	0.09 - 8	4520	NA				No	NUT
	129-00-0	PYRENE	0.018	3.1	mg/kg	SB-15	3 / 38	0.01 - 0.02	3.1	NA	2.9E+03 nc			Yes	FD
	7440-22-4	SILVER	0.55	1.2	mg/kg	SS-06	3 / 40	NR - NR	1.2	NA	5.1E+02 nc			Yes	FD
	7440-23-5	SODIUM	290	324	mg/kg	SS-04	2 / 2	0.09 - 8	324	NA				No	NUT
	127-18-4	TETRACHLOROETHENE	3.2	4.3	mg/kg	MIP3-B2	2 / 2	1 - 1	4.3	NA	1.3E-01 ca			Yes	FD
	7440-28-0	THALLIUM	0.9	2	mg/kg	2, SS-02, SS-06, SS-07, SS-08, SS-13, S	14 / 40	NR - NR	2	NA	6.7E+00 nc			Yes	FD
	79-01-6	TRICHLOROETHENE	0.028	0.028	mg/kg	MIP3-B2	1 / 2	0.08 - 0.085	0.028	NA	6.5E-01 ca			Yes	FD
	7440-62-2	VANADIUM	20	71	mg/kg	SB-05	40 / 40	10 - 10	71	NA	1.0E+02 nc			Yes	FD
	7440-66-6	ZINC	34	350	mg/kg	SB-12	40 / 40	0.001 - 0.085	350	NA	1.0E+04 max			Yes	FD

(1) Detection limits for detected chemicals in historical data were not available.
(2) Maximum detected concentration used for screening.
(3) Maximum detected background concentration.
(4) Screened against 1/10th EPA's Region 9 Preliminary Remediation Goals (PRGs) for industrial soil (EPA 2004c) to account for additivity of multiple chemicals.
(5) Not available.
(6) Chromium concentrations were divided between Chromium III and Chromium VI assuming a 1:6 ratio of Cr VI:Cr III
(7) Rationale Codes:

Selection Reason:
ASL: Above Screening Level
TOX: Chemical is a Class A Carcinogen
DET: Relatively few chemicals detected at site, so comparison with screening levels and frequency of detection were not used to eliminate COPCs
NSL: No Screening Level
FD: Frequent Detection
CARC: Infrequent Detection but Chemical is a Carcinogen

Deletion Reason:
BSL: Below Screening Level
BSL1: Infrequent Detection and Below Screening Level
NUT: Essential Nutrient
NTX: No Toxicity Information Available
NTX1: Infrequent Detection and No Toxicity Information Available
IFD: Infrequent Detection
IFD1: Infrequent Detection and Below Screening Level
STAT: Not a site contaminant according to separate statistical analysis, see text

Definitions:
NA: Not Available.
ND: Not Detected.
nc: Screening Toxicity Value is based on noncancer effects.
ca: Screening Toxicity Value is based on cancer effects.
COPC: Chemical of Potential Concern.
ARAR/TBC: Applicable or Relevant and Appropriate Requirement/To Be Considered
VOCs: Volatile Organic Compounds.
ug/kg: microgram per kilogram.
ca*: where: nc PRG < 100X ca PRG
ca**: where nc PRG < 10X ca PRG

Table 3-3
Summary of Detected Chemicals in Subsurface Soil Samples (>12 feet bgs)

Chemical	Detections			Detection Frequency		Reporting Limits	
	Minimum mg/kg	Maximum mg/kg	Maximum Location	Number of Detections	Total Samples	Minimum mg/kg	Maximum mg/kg
1,1,1,2-TETRACHLOROETHANE	0.0013	0.005	MIP3-B2-66	3	67	0.00078	0.25
1,1,1-TRICHLOROETHANE	0.00097	0.34	OC-SB-GP4-MIP-068-012104	30	71	0.00078	3
1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE	0.0059	0.068	OC-OU1-5	18	71	0.005	5
1,1,2-TRICHLOROETHANE	0.0015	0.14	OC-SB-GP4-MIP-068-012104	21	71	0.00078	3
1,1-DICHLOROETHANE	0.0011	0.03	OC-OU1-2	37	71	0.00086	3
1,1-DICHLOROETHENE	0.01	0.52	MIP22-B5-36	43	71	0.00084	3
1,2-DIBROMO-3-CHLOROPROPANE	0.016	0.016	OC-OU1-3	1	71	0.0039	0.51
1,2-DICHLOROBENZENE	0.00093	0.0022	OC-OU1-2	2	71	0.00078	3
1,2-DICHLOROETHANE	0.0019	0.26	MIP3-B2-33	27	71	0.00078	3
1,4-DIOXANE	0.018	41	MIP3-B2-15	17	69	0.025	0.2
ACETONE	0.012	0.022	MIP3-B2-57	2	71	0.006	50
BENZENE	0.0011	0.00755	MIP3-B2-57	18	71	0.00078	3
BROMOFORM	0.013	0.025	MIP3-B2-33	2	71	0.0012	3
CHLOROBENZENE	0.0015	0.0015	OC-OU1-2	1	71	0.00078	3
CHLOROFORM	0.0014	0.6	OC-OU1-1	46	71	0.00086	3
CIS-1,2-DICHLOROETHENE	0.0012	0.036	OC-OU1-1	13	71	0.00078	3
DI-ISOPROPYL ETHER (DIPE)	0.00099	0.00099	MIP8-B4-56	1	36	0.00078	0.21
METHYLENE CHLORIDE	0.0065	0.22	OC-OU1-5	8	71	0.005	3
TETRACHLOROETHENE	0.002	48	OC-SB-GP4-MIP-068-012104	65	71	0.00094	1
TOLUENE	0.0013	0.0059	OC-OU1-1	6	71	0.00078	3
TOTAL ORGANIC CARBON	510	6000	C-2-15-SOIL-1/30/96	51	57	500	500
TRANS-1,2-DICHLOROETHENE	0.00091	0.06	MIP1-B3-69	20	71	0.00078	3
TRICHLOROETHENE	0.0022	1	OC-OU1-5	56	71	0.002	3
TRICHLOROFLUOROMETHANE (FREON 11)	0.0031	0.038	MIP-14-B1-26, MIP-14-B1-34	17	71	0.0039	3

mg/kg = milligram per kilogram

Table 3-4
Comparison of Detected Chemicals in Subsurface Soil Samples >12 feet bgs with COPCs selected from <12 feet bgs

Chemical	Detections Maximum mg/kg	1/10th PRG	Is Maximum Detected Greater than 1/10th Screening?	Detection Frequency			Potential COPC?	COPC in <12 ft Samples?	Should it be considered a COPC?
				Number of Detections	Total Samples	Detection Frequency			
1,1,1,2-TETRACHLOROETHANE	0.005	0.318717	No	3	67	4%	No IFD	No	No
1,1,1-TRICHLOROETHANE	0.34	120	No	30	71	42%	Yes	Yes	No
1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE	0.068	560	No	18	71	25%	Yes	No	No
1,1,2-TRICHLOROETHANE	0.14	0.072863	Yes	21	71	30%	Yes	Yes	No
1,1-DICHLOROETHANE	0.03	0.278718	No	37	71	52%	Yes	Yes	No
1,1-DICHLOROETHENE	0.52	12.35307	No	43	71	61%	Yes	Yes	No
1,2-DIBROMO-3-CHLOROPROPANE	0.016	NA	No screening level	1	71	1%	No IFD	No	No
1,2-DICHLOROBENZENE	0.0022	60	No	2	71	3%	No IFD	Yes	No
1,2-DICHLOROETHANE	0.26	0.027773	Yes	27	71	38%	Yes	Yes	No
1,4-DIOXANE	41	4.421641	Yes	17	69	25%	Yes	Yes	No
ACETONE	0.022	1412.657	No	2	71	3%	No IFD	No	No
BENZENE	0.00755	0.064315	No	18	71	25%	Yes	No	No
BROMOFORM	0.025	6.156889	No	2	71	3%	No IFD	No	No
CHLOROBENZENE	0.0015	15.06579	No	1	71	1%	No IFD	No	No
CHLOROFORM	0.6	0.094127	Yes	46	71	65%	Yes	Yes	No
CIS-1,2-DICHLOROETHENE	0.036	4.29419	No	13	71	18%	Yes	No	No
DI-ISOPROPYL ETHER (DIPE)	0.00099	NA	No screening level	1	36	3%	No IFD	No	No
METHYLENE CHLORIDE	0.22	0.910699	No	8	71	11%	Yes	No	No
O-XYLENE	0.0016	NA	No screening level	1	71	1%	No IFD	No	No
TETRACHLOROETHENE	48	0.048359	Yes	65	71	92%	Yes	Yes	No
TOLUENE	0.0059	52	No	6	71	8%	Yes	No	No
TOTAL ORGANIC CARBON	6000	NA	No screening level	51	57	89%	Yes	No	No
TRANS-1,2-DICHLOROETHENE	0.06	6.948963	No	20	71	28%	Yes	No	No
TRICHLOROETHENE	1	0.29441	Yes	56	71	79%	Yes	Yes	No
TRICHLOROFLUOROMETHANE (FREON 11)	0.038	38.58179	No	17	71	24%	Yes	No	No

mg/kg = milligram per kilogram
IFD = infrequent detection less than 5%

Table 3-5
Summary of Detected Chemicals in Groundwater October 2004 to September 2006

Chemical	Units	Detections			Detection Frequency		Reporting Limits	
		Minimum	Maximum	Maximum Location	Number of Detections	Total Samples	Minimum	Maximum
1,1,2,2-TETRACHLOROETHANE	ug/l	0.67	0.67	OW-GW-OW-1-082406	1	84	0.5	1,000
1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE	ug/l	0.14	2,500	OC-GW-OW8-022305	65	84	0.5	6,300
1,1,2-TRICHLOROETHANE	ug/l	1.3	2,000	OC2-OW1A-W-0-90	11	84	0.5	630
1,1'-BIPHENYL	ug/l	0.8	1.8	OC2-OW4B-W-0-80	2	25	5	5
1,1-DICHLOROETHANE	ug/l	0.31	140	OC-GW-OW8-022305	33	84	0.5	1,000
1,1-DICHLOROETHENE	ug/l	0.28	5,100	OC-GW-OW1-082405	66	84	0.5	1,000
1,2,3-TRICHLOROPROPANE	ng/L	10	65	OC2-OW8-W-0-91	2	83	5	630,000
1,2,4-TRICHLOROBENZENE	ug/l	0.53	5	OC2-MW8D-W-0-110	2	84	0.5	1,000
1,2,4-TRIMETHYLBENZENE	ug/l	3.7	52	OC-GW-OW8-022305	4	58	1	630
1,2-DIBROMO-3-CHLOROPROPANE	ug/l	5.5	5.5	OW-GW-OW-4A-082306	1	84	5	1,000
1,2-DICHLOROBENZENE	ug/l	3	39	OC-GW-OW8-022305	8	84	0.5	1,000
1,2-DICHLOROETHANE	ug/l	0.27	1,200	OC-GW-OW8-022305	33	84	0.5	1,000
1,3,5-TRIMETHYLBENZENE	ug/l	0.815	13	OC-GW-OW8-022305	4	58	1	630
1,3-DICHLOROBENZENE	ug/l	0.61	1.4	OC-GW-OW8-022305	4	84	0.5	1,000
1,4-DICHLOROBENZENE	ug/l	0.58	3.6	OC-GW-OW8-022305	5	84	0.5	1,000
1,4-DIOXANE	ug/l	0.47	13,000	OC2-OW1A-W-0-90	52	84	0.47	5,000
2-BUTANONE	ug/l	1.4	570	OC-GW-OW8-022305	4	30	5	13,000
2-CHLOROTOLUENE	ug/l	0.41	0.47	OW-GW-OW-1-082406	2	58	1	630
2-METHYLNAPHTHALENE	ug/l	0.3	7.9	OC2-OW4B-W-0-80	4	32	5	10
4-CHLOROTOLUENE	ug/l	0.46	0.46	OW-GW-OW-1-082406	1	58	1	630
ACETONE	ug/l	4.4	10,000	OC-GW-OW8-022305	19	84	5	13,000
ACETOPHENONE	ug/l	2.2	2.2	OC2-OW8-W-0-91	1	25	5	5
ANTIMONY	ug/l	1.6	1.9	OC2-OW2-W-0-89[(1)]	25	34	10	60
ARSENIC	ug/l	0.45	17	OC2-OW8-W-0-91	25	34	0.005	0.005
BARIUM	ug/l	19	105	OC2-MW8D-W-0-110	33	33	10	10
BENZENE	ug/l	0.053	180	OC2-OW1A-W-0-90	28	84	0.5	630
BICARBONATE ALKALINITY (AS CACO3)	mg/L	240	540	OW-1	33	33	1	2
BIS(2-ETHYLHEXYL)PHTHALATE	ug/l	0.62	4.6	OC2-MW7A-W-0-102	13	32	5	48
BOD 5 DAY (BIOCHEMICAL OXYGEN DEMAND)	mg/L	2	24	OC2-OW8-W-0-91	26	30	2	2
BORON	ug/l	290	310	OW-8	2	2	100	100
BROMIDE	mg/L	0.17	62	OC2-OW8-W-0-91	26	26	0.5	0.5
BROMODICHLOROMETHANE	ug/l	0.7	1	OC-GW-OW5-022405	3	84	0.5	1,000
BROMOFORM	ug/l	1.2	5.1	OC-GW-OW6-082405	4	84	0.5	1,300
BROMOMETHANE	ug/l	0.062	180	OC2-OW1A-W-0-90	7	84	0.5	1,300
CALCIUM	ug/l	62,300	285,000	OC2-OW8-W-0-91	26	26	100	100
CAPROLACTAM	ug/l	0.15	7.7	OC2-OW1B-W-0-83	2	25	5	5
CARBON DISULFIDE	ug/l	0.28	0.28	OC2-OW1B-W-0-83	1	28	0.5	1,000
CARBON TETRACHLORIDE	ug/l	0.094	0.6	OC-GW-OW1-022505	5	84	0.5	1,000
CHEMICAL OXYGEN DEMAND	mg/L	3.6	81	OC2-OW8-W-0-91	22	30	10	20
CHLORIDE	mg/L	40	370	OC2-OW8-W-0-91	31	31	5	10
CHLOROBENZENE	ug/l	1.6	7.6	OC-GW-OW8-022305	7	84	0.5	1,000
CHLORODIBROMOMETHANE	ug/l	0.54	16	OC-GW-OW5-082305	7	56	1	200
CHLOROFORM	ug/l	0.054	2,750	OC-GW-OW8-022305	63	84	0.5	630
CHLOROMETHANE	ug/l	0.63	8.7	OC2-MW8D-W-0-110	5	84	0.5	1,300
CHROMIUM	ug/l	0.28	146	OC2-MW8A-W-0-107	32	34	5	10
CHROMIUM VI	ug/l	1.9	160	OC2-MW8A-W-0-107	21	26	1	1
CIS-1,2-DICHLOROETHENE	ug/l	0.19	51	OC2-MW1A-W-0-98	37	84	0.5	1,000
COBALT	ug/l	0.15	5	OC2-OW4A-W-0-81	25	34	10	20
COPPER	ug/l	0.32	79	EW4-091406	25	34	2	10
CYANIDE	ug/l	1.9	5.4	OC2-MW1A-W-0-98	6	25	10	10
CYCLOHEXANE	ug/l	0.32	2.1	OC2-OW4B-W-0-80	3	26	0.5	1,000

Table 3-5
Summary of Detected Chemicals in Groundwater October 2004 to September 2006

Chemical	Units	Detections			Detection Frequency		Reporting Limits	
		Minimum	Maximum	Maximum Location	Number of Detections	Total Samples	Minimum	Maximum
DICHLORODIFLUOROMETHANE	ug/l	0.19	1.35	OC-GW-OW8a-082405	11	84	0.5	1,300
DIMETHYL PHTHALATE	ug/l	0.68	0.68	OC2-OW8-W-0-91	1	32	5	10
ETHYLBENZENE	ug/l	0.051	41	OC-GW-OW8-022305	12	84	0.5	1,000
FLUORENE (ALPHA-DIPHENYLENEMETHANE)	ug/l	0.31	0.31	OC2-OW4B-W-0-80	1	32	5	10
FLUORIDE	mg/L	0.17	0.55	OC2-OW4B-W-0-80	25	25	NR	NR
HARDNESS (AS CACO3)	mg/L	560	840	OW-8	8	8	1	4
IRON	ug/l	42	2,620	OC2-OW8-W-0-91	13	33	40	100
ISOPHORONE	ug/l	2.2	2.2	OC2-OW8-W-0-91	1	32	5	10
ISOPROPYL ALCOHOL (ISOPROPANOL)	ug/l	140	140	OC-GW-OW1B-022505	1	1	50	50
ISOPROPYLBENZENE	ug/l	0.095	6.7	OC-GW-OW8-022305	11	84	0.5	1,000
LEAD	ug/l	0.02	75	EW4-091406	18	34	1	5
M,P-XYLENES	ug/l	0.63	130	OC-GW-OW8-022305	6	58	1	630
MAGNESIUM	ug/l	38,200	95,200	OC2-OW8-W-0-91	26	26	20	20
MANGANESE	ug/l	0.31	4,010	OC2-OW8-W-0-91	29	33	10	20
MBAS (DETERGENTS) (SURFACTANTS)	mg/L	0.36	0.36	OC-GW-OW8a-082405	1	1	0.1	0.1
MERCURY	ug/l	0.03	0.22	OW-8	9	33	0.2	0.2
METHYL ACETATE	ug/l	1,300	1,300	OC2-OW8-W-0-91	1	26	0.5	1,000
METHYL CYCLOHEXANE	ug/l	0.47	2.4	OC2-OW4B-W-0-80	3	26	0.5	1,000
METHYL TERT-BUTYL ETHER	ug/l	0.18	5.7	OC2-MW5A-W-0-97	20	84	0.5	1,000
METHYLENE CHLORIDE	ug/l	0.25	9,150	OC-GW-OW8-022305	22	84	0.5	13,000
MOLYBDENUM	mg/L	0.073	0.073	OC-GW-OW3B-031306	1	9	20	20
NAPHTHALENE	ug/l	0.21	20	EW2-091306	13	83	1	200
NICKEL	ug/l	0.9	50.5	OC2-OW5-W-0-86	25	34	10	20
NITRATE (AS N)	mg/L	1.3	21	OC2-MW5A-W-0-97	27	27	0.15	0.30
NITRITE (AS N)	mg/L	0.24	0.5	OC2-OW8-W-0-91	4	25	0.1	0.25
N-NITROSODIMETHYLAMINE	ng/L	3.1	680	OC2-OW8-W-0-91	6	37	1.9	10,000
N-PROPYLBENZENE	ug/l	0.35	5.7	OC-GW-OW8-022305	6	56	1	200
O-XYLENE	ug/l	0.25	76.5	OC-GW-OW8-022305	9	58	1	630
PENTACHLOROPHENOL (PCP)	ug/l	0.3	0.3	OC2-OW8-W-0-91	1	32	5	20
PERCHLORATE	ug/l	1.3	7.6	OC2-MW7A-W-0-102	24	25	1	1
PH	SU	6.57	6.8	OW-1	3	3	1	1
PHENANTHRENE	ug/l	0.069	0.069	OC2-OW8-W-0-91	1	32	5	10
PHENOL	ug/l	8.5	11	OW-8	2	32	5	10
P-ISOPROPYLTOLUENE	ug/l	0.29	0.86	OC-GW-OW8-022305	4	58	1	630
POTASSIUM	ug/l	2300	8140	OC2-MW10A-W-0-104	8	26	500	500
SEC-BUTYLBENZENE	ug/l	0.29	0.39	OC-GW-OW8-022305	4	58	1	630
SELENIUM	ug/l	1	19	/8D-W-0-110, OC2-MW7A-	26	33	5	10
SODIUM	ug/l	61,500	176,001	OC2-MW7A-W-0-102	26	26	500	500
SPECIFIC CONDUCTANCE (UMHO/CM X 10-6)	umhos/cm	1,800	1,800	OC-GW-OW8a-082405	1	1	1	1
SULFATE	mg/L	150	660	OC2-OW6-W-0-82	28	28	2.5	10
TETRACHLOROETHENE	ug/l	0.21	170,000	OC-GW-OW1-022505	84	84	1	5,000
TETRAHYDROFURAN	ug/l	540	650	OC-GW-OW8-022305	2	2	50	50
THALLIUM	mg/L	0.028	0.028	OC-GW-OW8a-082405	1	34	1	10
TOLUENE	ug/l	0.073	1,300	OC-GW-OW8-022305	14	84	0.5	630
TOTAL ALKALINITY (AS CACO3)	mg/L	240	540	OW-1	32	32	1	2
TOTAL DISSOLVED SOLIDS	mg/L	660	1,500	OC2-MW7A-W-0-102[(2)]	34	34	10	50
TOTAL KJELDAHL NITROGEN (ORGANIC NITRO)	mg/L	0.16	1	OC2-OW8-W-0-91	10	25	0.15	0.15
TOTAL ORGANIC CARBON	mg/L	4.7	74	OC2-OW1A-W-0-90	27	31	1	1
TOTAL PHOSPHORUS	mg/L	0.32	0.32	OC2-OW1B-W-0-83	1	25	0.15	0.15
TOTAL XYLENES	ug/l	0.055	4.6	OC2-OW4B-W-0-80	4	26	0.5	1,000
TRANS-1,2-DICHLOROETHENE	ug/l	0.32	98	OC2-OW8-W-0-91	28	84	0.5	1,000

Table 3-5
Summary of Detected Chemicals in Groundwater October 2004 to September 2006

Chemical	Units	Detections			Detection Frequency		Reporting Limits	
		Minimum	Maximum	Maximum Location	Number of Detections	Total Samples	Minimum	Maximum
TRICHLOROETHENE	ug/l	0.16	10,000	OC-GW-OW1-082405	73	84	0.5	1,000
TRICHLOROFLUOROMETHANE (FREON 11)	ug/l	0.18	1,000	OC-GW-OW2-02206	63	84	0.5	1,300
VANADIUM	ug/l	0.35	10	OC-GW-OW3B-031306	26	34	10	10
VINYL CHLORIDE	ug/l	0.775	0.78	OC-GW-OW8-022305	2	84	0.5	1,000
ZINC	ug/l	0.45	570	EW4-091406	28	34	2	20

mg/l = milligram per liter
ug/l = microgram per liter
ng/l = nanogram per liter
NR - Not reported

(1) Also includes OC2-OW6-W-0-82, OC2-MW4C-W-0-95, OC2-MW5A-W-0-97
(2) Also includes OC2-OW6-W-0-82, OC2-OW8-W-0-91

Table 3-6
Summary of Detected Chemicals in Groundwater 2001 to September 2004

Chemical	Units	Detections			Detection Frequency		Reporting Limits	
		Minimum	Maximum	Maximum Location	Number of Detections	Total Samples	Minimum	Maximum
1,1,1,2-TETRACHLOROETHANE	ug/l	1.7	32	OC-GW-OW1-021903	10	95	0.2	400
1,1,1-TRICHLOROETHANE	ug/l	0.055	10,250	OC-GW-OW1-082704	58	153	0.2	1,000
1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE	ug/l	0.35	2,800	OC2-OW8-W-0-29	118	153	0.5	2,000
1,1,2-TRICHLOROETHANE	ug/l	0.35	150	OC2-OW8-W-0-29	18	153	0.2	1,000
1,1-DICHLOROETHANE	ug/l	0.25	130	OW-GW-OW1-051601	47	153	0.2	1,000
1,1-DICHLOROETHENE	ug/l	0.23	2,700	OW-GW-OW1-051601	131	153	0.5	400
1,2,3-TRICHLOROPROPANE	ng/L	2.4	87	OC2-OW8-W-0-29	18	136	2	400,000
1,2,4-TRIMETHYLBENZENE	ug/l	0.8	11	OW8-112003	2	95	0.2	400
1,2-DICHLORO-1,1,2-TRIFLUOROETHANE	ug/l	50	88	OC-GW-OW8-082202	4	3	25	50
1,2-DICHLOROBENZENE	ug/l	1.2	15	OC-GW-OW1-021903	10	153	0.2	1,000
1,2-DICHLOROETHANE	ug/l	0.24	805	OC-GW-OW8-031103	50	153	0.2	1,000
1,2-DICHLOROPROPANE	ug/l	0.62	1.6	OC2-MW4A-W-0-25	2	153	0.2	1,000
1,3,5-TRIMETHYLBENZENE	ug/l	2.4	2.4	OW8-112003	1	95	0.2	400
1,3-DICHLOROBENZENE	ug/l	0.48	0.77	OC-GW-OW1-022404	4	153	0.2	1,000
1,4-DICHLOROBENZENE	ug/l	0.089	3	OC-GW-OW1-021903	7	153	0.2	1,000
1,4-DIOXANE	ug/l	0.5	52,280	OC-GW-OW1-021903	88	129	0.5	5,050
2,6-DINITROTOLUENE	ug/l	0.18	0.18	OC2-MW1A-W-0-45	1	66	5	10
2-BUTANONE	ug/l	0.83	770	OC2-OW8-W-0-29	5	63	2	10,000
2-CHLOROTOLUENE	ug/l	0.28	0.6	OC1-OW1-W-0-3	3	95	0.2	400
4-NITROPHENOL	ug/l	1.6	1.6	OC2-MW4A-W-0-58, OC2-MW4B-W-0-59	2	66	20	100
ACETONE	ug/l	3	11,000	OC2-OW8-W-0-29	35	153	2	10,000
ACETOPHENONE	ug/l	6.9	6.9	OC2-OW8-W-0-29	1	58	5	10
ALUMINUM	ug/l	47	87	OC2-MW9B-W-0-43	4	58	10	200
AMMONIA NITROGEN (AS N)	mg/L	0.23	0.29	OC2-OW1A-W-0-34	2	58	0.15	0.15
ANTIMONY	ug/l	0.18	0.37	OC2-MW4B-W-0-23	4	66	0.19	60
ARSENIC	ug/l	0.53	65	OC2-OW8-W-0-29	53	66	0.5	4
BARIUM	ug/l	10	136	OW-GW-OW1-051601	65	66	1	4
BENZENE	ug/l	0.051	88	OC2-OW1A-W-0-34	46	153	0.2	200
BENZO(B)FLUORANTHENE	ug/l	0.13	0.13	OC2-MW7A-W-0-73	1	66	5	10
BENZO(K)FLUORANTHENE	ug/l	0.55	0.55	OC2-MW4C-W-0-39	1	66	5	10
BICARBONATE ALKALINITY (AS CACO3)	mg/L	200	570	OC2-OW1A-W-0-34	58	58	NR	NR
BIS(2-ETHYLHEXYL)PHTHALATE	ug/l	2.5	80	OC2-MW5A-W-0-41	32	66	5	50
BOD 5 DAY (BIOCHEMICAL OXYGEN DEMAND)	mg/L	2	77	OC2-OW8-W-0-29	25	58	2	2
BORON	ug/l	120	680	OC2-MW7A-W-0-20	17	17	NR	NR
BROMIDE	mg/L	0.14	70	OC2-OW8-W-0-29	58	58	NR	NR
BROMOFORM	ug/l	0.3	0.95	OC2-MW4C-W-0-39	3	153	0.2	1,000
BROMOMETHANE	ug/l	2.5	2.5	OC2-MW8D-W-0-72	1	153	0.2	1,000
CADMIUM	ug/l	0.075	2.7	OC-GW-OW1-081701	3	66	0.07	5
CALCIUM	ug/l	49,500	285,999	OC2-OW8-W-0-29	58	58	NR	NR
CAPROLACTAM	ug/l	2	28	OC2-OW1A-W-0-34	5	58	5	10
CARBON DISULFIDE	ug/l	0.02	240	OC2-OW1A-W-0-34	5	59	0.5	50
CARBON TETRACHLORIDE	ug/l	0.073	1.1	OC-GW-OW6-021502	21	153	0.2	1,000
CHEMICAL OXYGEN DEMAND	mg/L	3.8	301	OC2-OW8-W-0-29	35	58	5	10
CHLORIDE	mg/L	43	370	OC2-OW8-W-0-29	58	58	NR	NR
CHLOROBENZENE	ug/l	0.75	500	OC2-OW1A-W-0-34	15	153	0.2	400
CHLOROETHANE	ug/l	0.2	0.2	OC1-OW1-W-0-23	1	153	0.2	1,000
CHLOROFORM	ug/l	0.046	2,000	OC-GW-OW8-031103	114	153	0.5	400
CHLOROMETHANE	ug/l	0.4	8.55	OC2-MW1A-W-0-45	17	153	0.2	1,000
CHROMIUM	ug/l	0.55	160	OC2-MW8A-W-0-12	58	66	0.35	4
CHROMIUM (VI)	ug/l	0.65	177	OC2-MW8A-W-0-12	56	65	NR	1
CHRYSENE	ug/l	0.69	0.69	OC2-MW4C-W-0-39	1	66	5	10

Table 3-6
Summary of Detected Chemicals in Groundwater 2001 to September 2004

Chemical	Units	Detections			Detection Frequency		Reporting Limits	
		Minimum	Maximum	Maximum Location	Number of Detections	Total Samples	Minimum	Maximum
CIS-1,2-DICHLOROETHENE	ug/l	0.14	97	OC-GW-OW5-022103	68	153	0.2	1,000
COBALT	ug/l	0.08	8.2	OW-GW-OW1-051601	32	66	0.12	50
COPPER	ug/l	0.44	11.3	OC-GW-OW1-021402	37	66	0.5	25
CYANIDE	ug/l	3.4	3.4	OC2-OW1A-W-0-34	1	65	5	25
CYCLOHEXANE	ug/l	1	16	OC2-MW5A-W-0-66	2	59	0.5	1,000
DICHLORODIFLUOROMETHANE	ug/l	0.19	7.7	OW8-112003	14	153	0.5	2,000
DI-N-BUTYLPHTHALATE	ug/l	0.54	1	OC2-MW5A-W-0-9, OC2-MW4A-W-0-5	4	66	5	20
DISSOLVED ORGANIC CARBON	mg/L	1.1	52	OC-GW-OW1-021903	7	7	1	5
ETHANE	ng/L	41.5	3,200	OC-GW-OW1-021903	3	3	5	5
ETHENE	ng/L	1,200	1,500	OC-GW-OW1B-021903	3	3	5	5
ETHYLBENZENE	ug/l	0.085	15	OC2-OW8-W-0-29	10	153	0.2	1,000
FLUORIDE	mg/L	0.14	0.6	OC2-MW4B-W-0-23	58	58	NR	NR
IRON	ug/l	33	3,350	OC2-OW1B-W-0-33	17	58	50	100
ISOPHORONE	ug/l	4.9	4.9	OC2-OW8-W-0-29	1	66	5	10
ISOPROPYL ALCOHOL (ISOPROPANOL)	ug/l	350	940	OW-GW-OW4B-051601	4	4	200	200
ISOPROPYLBENZENE	ug/l	1	2.4	OC1-OW1-W-0-3	7	153	0.2	1,000
LEAD	ug/l	0.07	2.9	OW-GW-OW1B-051601	23	66	0.07	10
M,P-XYLENES	ug/l	0.3	44	OW8-112003	7	95	0.2	400
MAGNESIUM	ug/l	36,500	99,999	OC2-OW8-W-0-29	58	58	NR	NR
MANGANESE	ug/l	0.48	2,490	OC2-OW8-W-0-29	23	58	1	15
MERCURY	ug/l	0.02	0.2	OC-GW-OW1b-021402	11	64	0.015	0.4
METHANE	ug/l	4.6	2,400	OC-GW-OW1B-021903	3	3	0.015	0.015
METHYL TERT-BUTYL ETHER	ug/l	0.12	270	OW-GW-OW6-051601	37	152	0.2	1,000
METHYLENE CHLORIDE	ug/l	0.089	8,600	OC2-OW8-W-0-29	36	153	0.2	2,000
MOLYBDENUM	ug/l	1.4	136	OC-GW-OW1b-111601	24	25	0.5	6
NAPHTHALENE	ug/l	0.43	0.6	OC1-OW1-W-0-3	3	153	0.2	400
NICKEL	ug/l	1.2	75	OW-GW-OW1-051601	53	66	1	40
NITRATE (AS N)	mg/L	0.17	20	OC2-MW5A-W-0-66 (1)	64	65	0.11	0.55
NITRATE-NITRITE AS NITROGEN	mg/L	3.7	11	OC-GW-OW4A-022003(2)	6	7	0.15	0.75
NITRITE (AS N)	mg/L	0.06	1	OC-GW-OW1B-021903	5	65	0.05	0.75
N-NITROSODIMETHYLAMINE	ng/L	2.5	900	OC2-OW8-W-0-29, OC1-OW1-W-0-3	17	58	2	21
N-PROPYLBENZENE	ug/l	0.42	0.7	OC1-OW1-W-0-23	4	95	0.2	400
O-XYLENE	ug/l	0.55	27	OC-GW-OW8-082404	9	95	0.2	400
PERCHLORATE	ug/l	1.2	10	OC2-MW7A-W-0-20	58	73	1	4
PHENOL	ug/l	20	20	OC2-OW8-W-0-29	1	66	5	10
P-ISOPROPYLTOLUENE	ug/l	0.32	0.7	OC1-OW1-W-0-3	4	95	0.2	400
POTASSIUM	ug/l	1,860	5,420	OC2-MW11A-W-0-77	37	58	2500	2,500
SEC-BUTYLBENZENE	ug/l	0.26	1.4	OC-GW-OW6-021502	2	95	0.2	400
SELENIUM	ug/l	1.1	227	OC2-OW8-W-0-29	53	66	1	35
SILICA (SAME AS SI AS SIO2)	ug/l	25,000	46,000	OC2-MW1A-W-0-1	17	17	NR	NR
SODIUM	ug/l	57,000	167,501	OC2-MW7A-W-0-73	58	58	NR	NR
SULFATE	mg/L	95	670	OC2-MW7A-W-0-20	58	58	NR	NR
TETRACHLOROETHENE	ug/l	0.97	210,000	OC1-OW1-W-0-23	149	153	0.5	2,500
THALLIUM	ug/l	0.08	9.65	OC2-MW1A-W-0-45	14	66	1	4
TOLUENE	ug/l	0.092	880	OC-GW-OW8-031103	28	153	0.2	400
TOTAL ALKALINITY (AS CACO3)	mg/L	200	570	OC2-OW1A-W-0-34	58	58	NR	NR
TOTAL DISSOLVED SOLIDS	mg/L	630	1,700	OC2-MW7A-W-0-20	58	58	NR	NR
TOTAL INORGANIC CARBON	ug/l	1.1	1.1	OC1-OW1-W-0-23	1	1	NR	NR
TOTAL KJELDAHL NITROGEN (ORGANIC NITRO)	mg/L	0.16	0.46	OC2-OW1A-W-0-34	8	58	0.15	0.15
TOTAL ORGANIC CARBON	mg/L	1.1	70	OC2-OW8-W-0-29	44	58	1	1
TOTAL XYLENES	ug/l	75	75	OC2-OW8-W-0-29	1	58	0.5	1,000

Table 3-6
Summary of Detected Chemicals in Groundwater 2001 to September 2004

Chemical	Units	Detections			Detection Frequency		Reporting Limits	
		Minimum	Maximum	Maximum Location	Number of Detections	Total Samples	Minimum	Maximum
TRANS-1,2-DICHLOROETHENE	ug/l	0.495	130	OC2-OW8-W-0-29	30	153	0.2	1,000
TRICHLOROETHENE	ug/l	0.31	3,600	OC-GW-OW1-022404	138	153	0.5	400
TRICHLOROFLUOROMETHANE (FREON 11)	ug/l	0.15	995	OC-GW-OW8-022003	114	153	0.5	1,000
VANADIUM	ug/l	0.41	17.2	OC-GW-OW1-081701	33	66	1	10
VINYL CHLORIDE	ug/l	0.5	0.9	OC1-OW1-W-0-23	4	153	0.2	1,000
ZINC	ug/l	1	260	OC-GW-OW1b-021402	34	66	1.6	80

(1) Also includes OC-GW-OW2-021903 and OC-GW-OW1-021903
(2) Also includes OC-GW-OW2-021903, OC-GW-OW1-021903
NR - Not reported
mg/l = milligram per liter
ug/l = microgram per liter
ng/l = nanogram per liter

TABLE 3-7a All Parcels - 5 to 6 feet bgs
OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - Soil Gas
Omega Chemical Site - Whittier, California

Scenario Timeframe:	Future
Medium:	Soil Gas - 5 to 6 ft bgs
Exposure Medium:	Indoor Air

Exposure Point	CAS Number	Chemical	Minimum Concentration	Maximum Concentration	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limts	Concentration Used for Screening (1)	Background Value (2)	Screening Toxicity Value (nc/ca) (3)	Potential ARAR/TBC Value	Potential ARAR/TBC Source (4)	COPC Flag (Y/N)	Rationale for Selection or Deletion (5)
Soil Gas															
	71-55-6	1,1,1-TRICHLOROETHANE	142	1,528,800	ug/m^3	OC-SG-006-VP08-081905	18 / 36	7.644 - 42042	1.5E+06	NA	2.8E+05			Yes	FD
	76-13-1	1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE	1,838	3,447,000	ug/m^3	OC-SG-06-01-041204	34 / 36	10.724 - 114900	3.4E+06	NA				Yes	FD
	79-00-5	1,1,2-TRICHLOROETHANE	1,420	1,420	ug/m^3	OC-SG-006-VP02-082205	1 / 36	7.644 - 10374	1.4E+03	NA				No	IFD1
	75-34-3	1,1-DICHLOROETHANE	36	105,300	ug/m^3	OC-SG-006-VP05-081705	17 / 36	5.67 - 16605	1.1E+05	NA				Yes	FD
	75-35-4	1,1-DICHLOROETHENE	83	1,071,900	ug/m^3	OC-SG-06-03-041204	34 / 36	5.558 - 22232	1.1E+06	NA				Yes	FD
	354-23-4	1,2-DICHLORO-1,1,2-TRIFLUOROETHANE	4,813	93,750	ug/m^3	OC-SG-06-03-041204	4 / 4	NR - NR	9.4E+04	NA				Yes	FD
	107-06-2	1,2-DICHLOROETHANE	93	10,125	ug/m^3	OC-SG-006-VP08-081905	5 / 36	5.67 - 7695	1.0E+04	NA	1.7E+01			Yes	FD
	540-84-1	2,2,4-TRIMETHYLPENTANE	36	56	ug/m^3	UC-10	3 / 23	6.538 - 7472	5.6E+01	NA				Yes	FD
	78-93-3	2-BUTANONE	103	103	ug/m^3	OC-SG-006-VP19-121305	1 / 35	4.13 - 4720	1.0E+02	NA				No	IFD1
	75-07-0	ACETALDEHYDE	97	97	ug/m^3	OC-SG-006-VP19-121305	1 / 1	NR - NR	9.7E+01	NA				Yes	FD
	67-64-1	ACETONE	81	21,182	ug/m^3	OC-SG-006-VP08-081905	15 / 35	13.804 - 15232	2.1E+04	NA				Yes	FD
	71-43-2	BENZENE	8	2,074	ug/m^3	OC-SG-006-VP05-081705	9 / 36	4.466 - 6061	2.1E+03	NA	1.2E+01			Yes	FD
	75-15-0	CARBON DISULFIDE	373	26,124	ug/m^3	OC-SG-006-VP08-081905	10 / 35	4.354 - 4976	2.6E+04	NA				Yes	FD
	56-23-5	CARBON TETRACHLORIDE	233	233	ug/m^3	OC-SG-006-VP11-081505	1 / 36	8.806 - 11951	2.3E+02	NA	8.5E+00			Yes	ASL
	67-66-3	CHLOROFORM	73	14,640	ug/m^3	OC-SG-006-VP04-082205, OC-SG-006-VP05-081705	18 / 36	6.832 - 9272	1.5E+04	NA				Yes	FD
	156-59-2	CIS-1,2-DICHLOROETHENE	285	36,828	ug/m^3	OC-SG-006-VP10-081505	9 / 36	5.544 - 7524	3.7E+04	NA	4.4E+03			Yes	FD
	75-71-8	DICHLORODIFLUOROMETHANE	18	9,405	ug/m^3	OC1-SG14A-G-0-28	7 / 36	6.93 - 7920	9.4E+03	NA				Yes	FD
	110-54-3	HEXANE (N-HEXANE)	11	11	ug/m^3	UC-10	1 / 23	4.928 - 5632	1.1E+01	NA				No	IFD1
		M,P-XYLENES	14	608	ug/m^3	OC-SG-006-VP11-081505	3 / 36	6.076 - 16492	6.1E+02	NA	8.9E+04			Yes	FD
	95-47-6	O-XYLENE	304	304	ug/m^3	OC-SG-006-VP11-081505	1 / 36	6.076 - 8246	3.0E+02	NA	8.8E+04			No	IFD1
	127-18-4	TETRACHLOROETHENE	949	3,390,000	ug/m^3	OC-SG-006-VP08-081905	34 / 36	9.492 - 52206	3.4E+06	NA	6.0E+01			Yes	FD
	108-88-3	TOLUENE	29	2,601	ug/m^3	SG-14-6FT	10 / 36	5.278 - 7163	2.6E+03	NA	3.8E+04			Yes	FD
	156-60-5	TRANS-1,2-DICHLOROETHENE	55	20,988	ug/m^3	OC-SG-006-VP04-082205	16 / 35	5.544 - 6336	2.1E+04	NA	8.9E+03			Yes	FD
	79-01-6	TRICHLOROETHENE	328	472,560	ug/m^3	OC-SG-06-03-041204	34 / 36	7.518 - 29535	4.7E+05	NA	1.8E+02			Yes	FD
	75-69-4	TRICHLOROFLUOROMETHANE (FREON 11)	551	1,011,600	ug/m^3	OC-SG-06-03-041204	34 / 36	7.868 - 61820	1.0E+06	NA				Yes	FD

(1) Maximum detected concentration from onsite samples
(2) Maximum detected background concentration.
(3) Screened against 1/10th EPA's Shallow Soil Gas Screening Levels for Human Health (Vapor Intrusion) for Commercial/Industrial Use (EPA 2005) to account for additivity of multiple chemicals.
(4) Rationale Codes:

Selection Reason: ASL: Above Screening Level
TOX: Chemical is a Class A Carcinogen
DET: Relatively few chemicals detected at site, so comparison with screening levels and frequency of detection were not used to eliminate COPCs
NSL: No Screening Level
FD: Frequent Detection
CARC: Infrequent Detection but Chemical is a Carcinogen

Deletion Reason: BSL: Below Screening Level
BSL1: Infrequent Detection and Below Screening Level
NUT: Essential Nutrient
NTX: No Toxicity Information Available
IFD: Infrequent Detection

Definitions: NA: Not Available.
ND: Not Detected.
nc: Screening Toxicity Value is based on noncancer effects.
ca: Screening Toxicity Value is based on cancer effects.
COPC: Chemical of Potential Concern.
ARAR/TBC: Applicable or Relevant and Appropriate Requirement/To Be Considered
ug/m^3: microgram per cubic meter.

TABLE 3-7b Site Parcel - 5 to 6 feet bgs
OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - Soil Gas
Omega Chemical Site - Whittier, California

Scenario Timeframe:	Future
Medium:	Soil Gas - 5 to 6 ft bgs
Exposure Medium:	Indoor Air/Ambient Air

Exposure Point	CAS Number	Chemical	Minimum Concentration	Maximum Concentration	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limts	Concentration Used for Screening (1)	Background Value (2)	Screening Toxicity Value (nc/ca) (3)	Potential ARAR/TBC Value	Potential ARAR/TBC Source (4)	COPC Flag (Y/N)	Rationale for Selection or Deletion (5)
Soil Gas															
	71-55-6	1,1,1-TRICHLOROETHANE	1,529	1,528,800	ug/m^3	OC-SG-006-VP08-081905	15 / 22	49.14 - 42042	1.5E+06	NA	2.8E+05			Yes	FD
	76-13-1	1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE	4,979	2,374,600	ug/m^3	OC-SG-06-11-041304	22 / 22	68.94 - 114900	2.4E+06	NA				Yes	FD
	79-00-5	1,1,2-TRICHLOROETHANE	1,420	1,420	ug/m^3	OC-SG-006-VP02-082205	1 / 22	49.14 - 8190	1.4E+03	NA				No	IFD1
	75-34-3	1,1-DICHLOROETHANE	36	105,300	ug/m^3	OC-SG-006-VP05-081705	16 / 22	36.45 - 16605	1.1E+05	NA				Yes	FD
	354-23-4	1,1-DICHLOROETHENE	6,749	992,500	ug/m^3	OC-SG-006-VP01-081905	22 / 22	35.73 - 22232	9.9E+05	NA				Yes	FD
		1,2-DICHLORO-1,1,2-TRIFLUOROETHANE	4,813	81,250	ug/m^3	OC-SG-06-05-041204	3 / 3	NR - NR	8.1E+04	NA				Yes	FD
	107-06-2	1,2-DICHLOROETHANE	93	10,125	ug/m^3	OC-SG-006-VP08-081905	5 / 22	36.45 - 6075	1.0E+04	NA	1.7E+01			Yes	FD
	78-93-3	2-BUTANONE	103	103	ug/m^3	OC-SG-006-VP19-121305	1 / 22	26.55 - 4425	1.0E+02	NA				No	IFD1
	75-07-0	ACETALDEHYDE	97	97	ug/m^3	OC-SG-006-VP19-121305	1 / 1	NR - NR	9.7E+01	NA				Yes	FD
	67-64-1	ACETONE	105	21,182	ug/m^3	OC-SG-006-VP08-081905	12 / 22	57.12 - 14518	2.1E+04	NA				Yes	FD
	71-43-2	BENZENE	45	2,074	ug/m^3	OC-SG-006-VP05-081705	7 / 22	28.71 - 4785	2.1E+03	NA	1.2E+01			Yes	FD
	75-15-0	CARBON DISULFIDE	373	26,124	ug/m^3	OC-SG-006-VP08-081905	10 / 22	27.99 - 4665	2.6E+04	NA				Yes	FD
	56-23-5	CARBON TETRACHLORIDE	233	233	ug/m^3	OC-SG-006-VP11-081505	1 / 22	56.61 - 9435	2.3E+02	NA	8.5E+00			Yes	ASL
	67-66-3	CHLOROFORM	93	14,640	ug/m^3	OC-SG-006-VP04-082205, OC-SG-006-VP05-081705	16 / 22	43.92 - 7320	1.5E+04	NA				Yes	FD
	156-59-2	CIS-1,2-DICHLOROETHENE	285	36,828	ug/m^3	OC-SG-006-VP10-081505	9 22	35.64 - 5940	3.7E+04	NA	4.4E+03			Yes	FD
	75-71-8	DICHLORODIFLUOROMETHANE	64	941	ug/m^3	OC-SG-006-VP11-081505	2 / 22	44.55 - 7425	9.4E+02	NA				Yes	FD
		M,P-XYLENES	608	608	ug/m^3	OC-SG-006-VP11-081505	1 / 22	39.06 - 6510	6.1E+02	NA	8.9E+04			No	IFD1
		O-XYLENE	304	304	ug/m^3	OC-SG-006-VP11-081505	1 / 22	39.06 - 6510	3.0E+02	NA	8.8E+04			No	IFD1
	127-18-4	TETRACHLOROETHENE	16,272	3,390,000	ug/m^3	OC-SG-006-VP08-081905	22 / 22	61.02 - 52206	3.4E+06	NA	6.0E+01			Yes	FD
	108-88-3	TOLUENE	75	1,169	ug/m^3	OC-SG-006-VP05-081705	6 / 22	33.93 - 5655	1.2E+03	NA	3.8E+04			Yes	FD
	156-60-5	TRANS-1,2-DICHLOROETHENE	55	20,988	ug/m^3	OC-SG-006-VP04-082205	14 / 22	35.64 - 5940	2.1E+04	NA	8.9E+03			Yes	FD
	79-01-6	TRICHLOROETHENE	3,061	451,080	ug/m^3	OC-SG-006-VP01-081905	22 / 22	48.33 - 29535	4.5E+05	NA	1.8E+02			Yes	FD
	75-69-4	TRICHLOROFLUOROMETHANE (FREON 11)	4,271	786,800	ug/m^3	OC-SG-06-11-041304	22 / 22	50.58 - 61820	7.9E+05	NA				Yes	FD

(1) Maximum detected concentration from onsite samples
(2) Maximum detected background concentration.
(3) Screened against 1/10th EPA's Shallow Soil Gas Screening Levels for Human Health (Vapor Intrusion) for Commercial/Industrial Use (EPA 2005) to account for additivity of multiple chemicals.
(4) Rationale Codes:

Selection Reason: ASL: Above Screening Level
TOX: Chemical is a Class A Carcinogen
DET: Relatively few chemicals detected at site, so comparison with screening levels and frequency of detection were not used to eliminate COPCs
NSL: No Screening Level
FD: Frequent Detection
CARC: Infrequent Detection but Chemical is a Carcinogen

Deletion Reason: BSL: Below Screening Level
BSL1: Infrequent Detection and Below Screening Level
NUT: Essential Nutrient
NTX: No Toxicity Information Available
IFD: Infrequent Detection

Definitions: NA: Not Available.
ND: Not Detected.
nc: Screening Toxicity Value is based on noncancer effects.
ca: Screening Toxicity Value is based on cancer effects.
COPC: Chemical of Potential Concern.
ARAR/TBC: Applicable or Relevant and Appropriate Requirement/To Be Considered
ug/m^3: microgram per cubic meter.

TABLE 3-7c Other Parcels - 5 to 6 feet bgs
OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - Soil Gas
Omega Chemical Site - Whittier, California

Scenario Timeframe:	Future
Medium:	Soil Gas - 5 to 6 ft bgs
Exposure Medium:	Indoor Air/Ambient Air

Exposure Point	CAS Number	Chemical	Minimum Concentration	Maximum Concentration	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limts	Concentration Used for Screening (1)	Background Value (2)	Screening Toxicity Value (nc/ca) (3)	Potential ARAR/TBC Value	Potential ARAR/TBC Source (4)	COPC Flag (Y/N)	Rationale for Selection or Deletion (5)
Soil Gas															
	71-55-6	1,1,1-TRICHLOROETHANE	142	10,920	ug/m^3	OC-SG-06-02-041204	3 / 12	7.644 - 10374	1.1E+04	NA	2.8E+05			Yes	FD
	76-13-1	1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE	1,838	3,447,000	ug/m^3	OC-SG-06-01-041204	12 / 12	10.724 - 12256	3.4E+06	NA				Yes	FD
	75-34-3	1,1-DICHLOROETHANE	1,053	1,053	ug/m^3	OC1-LC3-G-0-8	1 / 12	5.67 - 7695	1.1E+03	NA				Yes	FD
	75-35-4	1,1-DICHLOROETHENE	83	1,071,900	ug/m^3	OC-SG-06-03-041204	12 / 12	5.558 - 6352	1.1E+06	NA				Yes	FD
		1,2-DICHLORO-1,1,2-TRIFLUOROETHANE	93,750	93,750	ug/m^3	OC-SG-06-03-041204	1 / 1	NR - NR	9.4E+04	NA				Yes	FD
	354-23-4	2,2,4-TRIMETHYLPENTANE	36	56	ug/m^3	UC-10	3 / 10	6.538 - 7472	5.6E+01	NA				Yes	FD
	67-64-1	ACETONE	81	186	ug/m^3	SG-15-6FT	3 / 10	13.804 - 15232	1.9E+02	NA				Yes	FD
	540-84-1	BENZENE	8	16	ug/m^3	SG-15-6FT	2 / 12	4.466 - 6061	1.6E+01	NA	1.2E+01			Yes	FD
	67-66-3	CHLOROFORM	73	1,757	ug/m^3	OC1-LC3-G-0-8	2 / 12	6.832 - 9272	1.8E+03	NA				Yes	FD
	75-71-8	DICHLORODIFLUOROMETHANE	18	9,405	ug/m^3	OC1-SG14A-G-0-28	5 / 12	6.93 - 7920	9.4E+03	NA				Yes	FD
	110-54-3	HEXANE (N-HEXANE)	11	11	ug/m^3	UC-10	1 / 10	4.928 - 5632	1.1E+01	NA				Yes	FD
		M,P-XYLENES	14	30	ug/m^3	SG-15-6FT	2 / 12	6.076 - 16492	3.0E+01	NA	8.9E+04			Yes	FD
		TETRACHLOROETHENE	949	2,101,800		OC-SG-06-01-041204	12 / 12	9.492 - 10848	2.1E+06	NA	6.0E+01				
	127-18-4				ug/m^3									Yes	FD
	108-88-3	TOLUENE	29	2,601	ug/m^3	SG-14-6FT	4 / 12	5.278 - 7163	2.6E+03	NA	3.8E+04			Yes	FD
		TRANS-1,2-DICHLOROETHENE	6,732	9,900	ug/m^3	OC-SG-06-02-041204	2 / 10	5.544 - 6336	9.9E+03	NA	8.9E+03				
	156-60-5													Yes	FD
	79-01-6	TRICHLOROETHENE	328	472,560	ug/m^3	OC-SG-06-03-041204	12 / 12	7.518 - 8592	4.7E+05	NA	1.8E+02			Yes	FD
	75-69-4	TRICHLOROFLUOROMETHANE (FREON 11)	551	1,011,600	ug/m^3	OC-SG-06-03-041204	12 / 12	7.868 - 8992	1.0E+06	NA				Yes	FD

(1) Maximum detected concentration from onsite samples
(2) Maximum detected background concentration.
(3) Screened against 1/10th EPA's Shallow Soil Gas Screening Levels for Human Health (Vapor Intrusion) for Commercial/Industrial Use (EPA 2005) to account for additivity of multiple chemicals.
(4) Rationale Codes:

Selection Reason: ASL: Above Screening Level
TOX: Chemical is a Class A Carcinogen
DET: Relatively few chemicals detected at site, so comparison with screening levels and frequency of detection were not used to eliminate COPCs
NSL: No Screening Level
FD: Frequent Detection
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Deletion Reason: BSL: Below Screening Level
BSL1: Infrequent Detection and Below Screening Level
NUT: Essential Nutrient
NTX: No Toxicity Information Available
IFD: Infrequent Detection

Definitions: NA: Not Available.
ND: Not Detected.
nc: Screening Toxicity Value is based on noncancer effects.
ca: Screening Toxicity Value is based on cancer effects.
COPC: Chemical of Potential Concern.
ARAR/TBC: Applicable or Relevant and Appropriate Requirement/To Be Considered
ug/m^3: microgram per cubic meter.

TABLE 3-8a All Parcels - 5 to 30 feet bgs
OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - Soil Gas
Omega Chemical Site - Whittier, California

Scenario Timeframe:	Future
Medium:	Soil Gas - 5 to 30 ft bgs
Exposure Medium:	Ambient Air in Excavation

Exposure Point	CAS Number	Chemical	Minimum Concentration	Maximum Concentration	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limts	Concentration Used for Screening (1)	Background Value (2)	Screening Toxicity Value (nc/ca) (3)	Potential ARAR/TBC Value	Potential ARAR/TBC Source (4)	COPC Flag (Y/N)	Rationale for Selection or Deletion (5)
Soil Gas															
	71-55-6	1,1,1-TRICHLOROETHANE	142	2,457,000	ug/m3	OC-SG-018-VP08-081905	66 / 127	4.368 - 51870	2.5E+06	NA	2.8E+05			Yes	FD
	76-13-1	1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE	13	3,447,000	ug/m3	OC-SG-06-01-041204	144 / 146	7.66 - 145540	3.4E+06	NA				Yes	FD
	79-00-5	1,1,2-TRICHLOROETHANE	328	1,420	ug/m3	OC-SG-006-VP02-082205	9 / 118	4.368 - 22386	1.4E+03	NA				Yes	FD
	75-34-3	1,1-DICHLOROETHANE	24	105,300	ug/m3	OC-SG-006-VP05-081705	71 / 130	3.24 - 16605	1.1E+05	NA				Yes	FD
	75-35-4	1,1-DICHLOROETHENE	83	1,905,600	ug/m3	OC1-SG11A-G-0-24	142 / 146	3.97 - 24217	1.9E+06	NA				Yes	FD
	95-63-6	1,2,4-TRIMETHYLBENZENE	9	33	ug/m3	OC-SG-018-VP19-121305	7 / 121	3.936 - 20172	3.3E+01	NA				Yes	FD
	354-23-4	1,2-DICHLORO-1,1,2-TRIFLUOROETHANE	3,000	93,750	ug/m3	OC-SG-06-03-041204	10 / 10	NR - NR	9.4E+04	NA				Yes	FD
	107-06-2	1,2-DICHLOROETHANE	32	10,125	ug/m3	OC-SG-024-VP06-081605, OC-SG-006-VP08-081905	24 / 119	3.24 - 16605	1.0E+04	NA	1.7E+01			Yes	FD
	106-99-0	1,3-BUTADIENE	3	139	ug/m3	OC-SG-029-VP30-060106	10 / 70	2.21 - 3757	1.4E+02	NA				Yes	FD
	540-84-1	2,2,4-TRIMETHYLPENTANE	5	1,541	ug/m3	OC-SG-008-VP13-121205	15 / 74	4.67 - 7939	1.5E+03	NA				Yes	FD
	78-93-3	2-BUTANONE	4	174	ug/m3	OC-SG-029-VP30-060106	18 / 119	2.95 - 5015	1.7E+02	NA				Yes	FD
		2-PROPANOL	9,840	36,900	ug/m3	OC-SG-029-VP13-121205	4 / 68	9.84 - 16728	3.7E+04	NA				Yes	FD
		4-ETHYLTOLUENE	7	42	ug/m3	OC-SG-018-VP19-121305	5 / 116	4.92 - 8364	4.2E+01	NA				No	IFD1
		4-METHYL-2-PENTANONE	16	16	ug/m3	OC-SG-025-VP25-030606	1 / 112	4.1 - 6970	1.6E+01	NA				No	IFD1
	75-07-0	ACETALDEHYDE	97	112	ug/m3	OC-SG-012-VP19-121305	3 / 3	NR - NR	1.1E+02	NA				Yes	FD
	67-64-1	ACETONE	15	21,182	ug/m3	OC-SG-006-VP08-081905	71 / 125	9.52 - 16184	2.1E+04	NA				Yes	FD
	71-43-2	BENZENE	3	3,828	ug/m3	OC-SG-018-VP03-081805	42 / 126	3.19 - 13079	3.8E+03	NA	1.2E+01			Yes	FD
	75-27-4	BROMODICHLOROMETHANE	9	24	ug/m3	OC-SG-008-VP30-060106	4 / 113	6.7 - 11390	2.4E+01	NA				Yes	CARC
	75-25-2	BROMOFORM	13	13	ug/m3	OC-SG-010-VP26-053106	1 / 112	10.34 - 17578	1.3E+01	NA				Yes	CARC
	75-15-0	CARBON DISULFIDE	3	26,124	ug/m3	OC-SG-006-VP08-081905	44 / 116	3.11 - 5287	2.6E+04	NA				Yes	FD
	56-23-5	CARBON TETRACHLORIDE	126	233	ug/m3	OC-SG-012-VP04-082205, OC-SG-006-VP11-081505	4 / 117	5.032 - 25789	2.3E+02	NA	8.5E+00			Yes	ASL
	67-66-3	CHLOROFORM	7	107,360	ug/m3	OC-SG-029-VP13-121205	78 / 132	3.904 - 20008	1.1E+05	NA				Yes	FD
	156-59-2	CIS-1,2-DICHLOROETHENE	51	37,620	ug/m3	OC-SG-018-VP10-081505, OC-SG-012-VP10-081505	39 / 124	3.168 - 16236	3.8E+04	NA	4.4E+03			Yes	FD
	110-82-7	CYCLOHEXANE	4	963	ug/m3	OC-SG-008-VP13-121205	8 / 71	3.44 - 5848	9.6E+02	NA				Yes	FD
	124-48-1	DIBROMOCHLOROMETHANE	9	14	ug/m3	OC-SG-010-VP26-053106	2 / 112	8.52 - 14484	1.4E+01	NA				Yes	CARC
	75-71-8	DICHLORODIFLUOROMETHANE	11	9,405	ug/m3	OC1-SG14A-G-0-28	29 / 121	3.96 - 20295	9.4E+03	NA				Yes	FD
		ETHANOL	13	254	ug/m3	OC-SG-12-01-041204	8 / 69	7.52 - 12784	2.5E+02	NA				Yes	FD
	100-41-4	ETHYLBENZENE	6	30	ug/m3	OC-SG-018-VP19-121305	9 / 122	3.472 - 17794	3.0E+01	NA	0.0E+00			Yes	FD
		HEPTANE	5	127	ug/m3	OC-SG-018-VP19-121305	10 / 72	4.1 - 6970	1.3E+02	NA				Yes	FD
	110-54-3	HEXANE (N-HEXANE)	4	4,576	ug/m3	SG-8-18FT	19 / 73	3.52 - 5984	4.6E+03	NA				Yes	FD
		M,P-XYLENES	10	608	ug/m3	OC-SG-006-VP11-081505	22 / 124	4.34 - 35154	6.1E+02	NA	8.9E+04			Yes	FD
	1634-04-4	METHYL TERT-BUTYL ETHER	19	21	ug/m3	OC-SG-029-VP25-030606	2 / 113	3.61 - 11191	2.1E+01	NA	1.3E+03			Yes	CARC

TABLE 3-8a All Parcels - 5 to 30 feet bgs
OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - Soil Gas
Omega Chemical Site - Whittier, California

Scenario Timeframe:	Future
Medium:	Soil Gas - 5 to 30 ft bgs
Exposure Medium:	Ambient Air in Excavation

Exposure Point	CAS Number	Chemical	Minimum Concentration	Maximum Concentration	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limts	Concentration Used for Screening (1)	Background Value (2)	Screening Toxicity Value (nc/ca) (3)	Potential ARAR/TBC Value	Potential ARAR/TBC Source (4)	COPC Flag (Y/N)	Rationale for Selection or Deletion (5)
	75-09-2	METHYLENE CHLORIDE	8	23,249	ug/m^3	OC-SG-018-VP03-081805	14 / 120	2.776 - 14227	2.3E+04	NA				Yes	FD
	95-47-6	O-XYLENE	5	3,472	ug/m^3	OC-SG-018-VP08-081905	14 / 122	3.472 - 17794	3.5E+03	NA	8.8E+04			Yes	FD
		PENTANE	21,535	21,535	ug/m^3	OC-SG-008-VP13-121205	1 / 1	NR - NR	2.2E+04	NA				Yes	FD
	127-18-4	TETRACHLOROETHENE	12	3,390,000	ug/m^3	OC-SG-006-VP08-081905	143 / 146	6.78 - 64410	3.4E+06	NA	6.0E+01			Yes	FD
	109-99-9	TETRAHYDROFURAN	3	3,835	ug/m^3	SG-8-18FT	3 / 67	2.95 - 5015	3.8E+03	NA				Yes	CARC
	108-88-3	TOLUENE	8	15,080	ug/m^3	OC1-SG8A-G-0-25	57 / 130	3.77 - 15457	1.5E+04	NA	3.8E+04			Yes	FD
	156-60-5	TRANS-1,2-DICHLOROETHENE	35	24,552	ug/m^3	OC-SG-018-VP02-082205	54 / 119	3.96 - 6732	2.5E+04	NA	8.9E+03			Yes	FD
	79-01-6	TRICHLOROETHENE	54	472,560	ug/m^3	OC-SG-06-03-041204	137 / 145	5.37 - 29535	4.7E+05	NA	1.8E+02			Yes	FD
	75-69-4	TRICHLOROFLUOROMETHANE (FREON 11)	6	1,236,400	ug/m^3	OC1-SG11A-G-0-24	145 / 146	5.62 - 61820	1.2E+06	NA				Yes	FD
	75-01-4	VINYL CHLORIDE	33	79	ug/m^3	OC-SG-012-VP04-082205	2 / 117	2.048 - 10496	7.9E+01	NA	4.5E+00			Yes	ASL

(1) Maximum detected concentration from onsite samples
(2) Maximum detected background concentration.
(3) Screened against 1/10th EPA's Shallow Soil Gas Screening Levels for Human Health (Vapor Intrusion) for Commercial/Industrial Use (EPA 2005) to account for additivity of multiple chemicals.
(4) Rationale Codes:

Selection Reason: ASL: Above Screening Level
TOX: Chemical is a Class A Carcinogen
DET: Relatively few chemicals detected at site, so comparison with screening levels and frequency of detection were not used to eliminate COPCs
NSL: No Screening Level
FD: Frequent Detection
CARC: Infrequent Detection but Chemical is a Carcinogen

Deletion Reason: BSL: Below Screening Level
BSL1: Infrequent Detection and Below Screening Level
NUT: Essential Nutrient
NTX: No Toxicity Information Available
IFD: Infrequent Detection

Definitions: NA: Not Available.
ND: Not Detected.
nc: Screening Toxicity Value is based on noncancer effects.
ca: Screening Toxicity Value is based on cancer effects.
COPC: Chemical of Potential Concern.
ARAR/TBC: Applicable or Relevant and Appropriate Requirement/To Be Considered
ug/m^3: microgram per cubic meter.

TABLE 3-8b Site Parcel - 5 to 30 feet bgs
OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - Soil Gas
Omega Chemical Site - Whittier, California

Scenario Timeframe:	Future
Medium:	Soil Gas - 5 to 30 ft bgs
Exposure Medium:	Ambient Air in Excavation

Exposure Point	CAS Number	Chemical	Minimum Concentration	Maximum Concentration	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limts	Concentration Used for Screening (1)	Background Value (2)	Screening Toxicity Value (nc/ca) (3)	Potential ARAR/TBC Value	Potential ARAR/TBC Source (4)	COPC Flag (Y/N)	Rationale for Selection or Deletion (5)
Soil Gas															
	71-55-6	1,1,1-TRICHLOROETHANE	197	2,457,000	ug/m3	OC-SG-018-VP08-081905	58 / 77	17.472 - 51870	2.5E+06	NA	2.8E+05			Yes	FD
	76-13-1	1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE	2,604	2,910,800	ug/m3	OC1-SG11A-G-0-24	87 / 87	24.512 - 145540	2.9E+06	NA				Yes	FD
	79-00-5	1,1,2-TRICHLOROETHANE	328	1,420	ug/m3	OC-SG-006-VP02-082205	9 / 71	17.472 - 22386	1.4E+03	NA				Yes	FD
	75-34-3	1,1-DICHLOROETHANE	24	105,300	ug/m3	OC-SG-006-VP05-081705	65 / 82	12.96 - 16605	1.1E+05	NA				Yes	FD
	75-35-4	1,1-DICHLOROETHENE	1,528	1,905,600	ug/m3	OC1-SG11A-G-0-24	87 / 87	12.704 - 24217	1.9E+06	NA				Yes	FD
	95-63-6	1,2,4-TRIMETHYLBENZENE	17	33	ug/m3	OC-SG-018-VP19-121305	2 / 72	15.744 - 20172	3.3E+01	NA				No	IFD1
	354-23-4	1,2-DICHLORO-1,1,2-TRIFLUOROETHANE	3,000	81,250	ug/m3	OC-SG-06-05-041204	8 / 8	NR - NR	8.1E+04	NA				Yes	FD
	107-06-2	1,2-DICHLOROETHANE	32	10,125	ug/m3	OC-SG-024-VP06-081605,OC-SG-006-VP08-081905	24 / 72	12.96 - 16605	1.0E+04	NA	1.7E+01			Yes	FD
	106-99-0	1,3-BUTADIENE	11	11	ug/m3	OC-SG-024-VP19-121305	1 / 23	7.072 - 3757	1.1E+01	NA				Yes	CARC
	540-84-1	2,2,4-TRIMETHYLPENTANE	458	701	ug/m3	OC-SG-024-VP19-121305	2 / 24	14.944 - 7939	7.0E+02	NA				Yes	FD
	78-93-3	2-BUTANONE	103	171	ug/m3	OC-SG-018-VP19-121305	4 / 71	9.44 - 5015	1.7E+02	NA				Yes	FD
		2-PROPANOL	13,284	13,284	ug/m3	SG-8-18FT	1 / 22	31.98 - 16728	1.3E+04	NA				No	IFD1
		4-ETHYLTOLUENE	20	42	ug/m3	OC-SG-018-VP19-121305	2 / 69	15.744 - 8364	4.2E+01	NA				No	IFD1
	75-07-0	ACETALDEHYDE	97	112	ug/m3	OC-SG-012-VP19-121305	3 / 3	NR - NR	1.1E+02	NA				Yes	FD
	67-64-1	ACETONE	105	21,182	ug/m3	OC-SG-006-VP08-081905	51 / 74	30.94 - 16184	2.1E+04	NA				Yes	FD
	71-43-2	BENZENE	31	3,828	ug/m3	OC-SG-018-VP03-081805	28 / 75	10.208 - 13079	3.8E+03	NA	1.2E+01			Yes	FD
	75-15-0	CARBON DISULFIDE	249	26,124	ug/m3	OC-SG-006-VP08-081905	39 / 70	9.952 - 5287	2.6E+04	NA				Yes	FD
	56-23-5	CARBON TETRACHLORIDE	126	233	ug/m3	OC-SG-012-VP04-082205,OC-SG-006-VP11-081505	4 / 70	20.128 - 25789	2.3E+02	NA	8.5E+00			Yes	FD
	67-66-3	CHLOROFORM	49	48,800	ug/m3	OC-SG-018-VP03-081805	61 / 80	15.616 - 20008	4.9E+04	NA				Yes	FD
	156-59-2	CIS-1,2-DICHLOROETHENE	51	37,620	ug/m3	OC-SG-018-VP10-081505,OC-SG-012-	36 / 76	12.672 - 16236	3.8E+04	NA	4.4E+03			Yes	FD
	110-82-7	CYCLOHEXANE	17	24	ug/m3	OC-SG-018-VP19-121305	2 / 24	11.008 - 5848	2.4E+01	NA				Yes	FD
	75-71-8	DICHLORODIFLUOROMETHANE	59	1,238	ug/m3	OC-SG-024-VP02-082205	13 / 70	15.84 - 20295	1.2E+03	NA				Yes	FD
		ETHANOL	128	128	ug/m3	SG-9-24FT	1 / 22	24.44 - 12784	1.3E+02	NA				No	IFD1
	100-41-4	ETHYLBENZENE	17	30	ug/m3	OC-SG-018-VP19-121305	2 / 72	13.888 - 17794	3.0E+01	NA	0.0E+00			Yes	ASL
		HEPTANE	115	127	ug/m3	OC-SG-018-VP19-121305	2 / 24	13.12 - 6970	1.3E+02	NA				Yes	FD
	110-54-3	HEXANE (N-HEXANE)	197	4,576	ug/m3	SG-8-18FT	3 / 24	11.264 - 5984	4.6E+03	NA				Yes	FD
		M,P-XYLENES	61	608	ug/m3	OC-SG-006-VP11-081505	6 / 73	13.888 - 35154	6.1E+02	NA	8.9E+04			Yes	FD
	75-09-2	METHYLENE CHLORIDE	555	23,249	ug/m3	OC-SG-018-VP03-081805	7 / 72	11.104 - 14227	2.3E+04	NA				Yes	FD
	95-47-6	O-XYLENE	29	3,472	ug/m3	OC-SG-018-VP08-081905	6 / 72	13.888 - 17794	3.5E+03	NA	8.8E+04			Yes	FD
	127-18-4	TETRACHLOROETHENE	488	3,390,000	ug/m3	OC-SG-006-VP08-081905	87 / 87	21.696 - 64410	3.4E+06	NA	6.0E+01			Yes	FD
	109-99-9	TETRAHYDROFURAN	3,835	3,835	ug/m3	SG-8-18FT	1 / 22	9.44 - 5015	3.8E+03	NA				Yes	CARC
	108-88-3	TOLUENE	60	15,080	ug/m3	OC1-SG8A-G-0-25	33 / 77	12.064 - 15457	1.5E+04	NA	3.8E+04			Yes	FD

TABLE 3-8b Site Parcel - 5 to 30 feet bgs
OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - Soil Gas
Omega Chemical Site - Whittier, California

Scenario Timeframe:	Future
Medium:	Soil Gas - 5 to 30 ft bgs
Exposure Medium:	Ambient Air in Excavation

Exposure Point	CAS Number	Chemical	Minimum Concentration	Maximum Concentration	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limts	Concentration Used for Screening (1)	Background Value (2)	Screening Toxicity Value (nc/ca) (3)	Potential ARAR/TBC Value	Potential ARAR/TBC Source (4)	COPC Flag (Y/N)	Rationale for Selection or Deletion (5)
	156-60-5	TRANS-1,2-DICHLOROETHENE	35	24,552	ug/m^3	OC-SG-018-VP02-082205	51 / 73	12.672 - 6732	2.5E+04	NA	8.9E+03			Yes	FD
	79-01-6	TRICHLOROETHENE	199	451,080	ug/m^3	OC-SG-006-VP01-081905	87 / 87	17.184 - 29535	4.5E+05	NA	1.8E+02			Yes	FD
	75-69-4	TRICHLOROFLUOROMETHANE (FREON 11)	1,068	1,236,400	ug/m^3	OC1-SG11A-G-0-24	87 / 87	17.984 - 61820	1.2E+06	NA				Yes	FD
	75-01-4	VINYL CHLORIDE	33	79	ug/m^3	OC-SG-012-VP04-082205	2 / 70	8.192 - 10496	7.9E+01	NA	4.5E+00			Yes	ASL

(1) Maximum detected concentration from onsite samples
(2) Maximum detected background concentration.
(3) Screened against 1/10th EPA's Shallow Soil Gas Screening Levels for Human Health (Vapor Intrusion) for Commercial/Industrial Use (EPA 2005) to account for additivity of multiple chemicals.
(4) Rationale Codes:

Selection Reason: ASL: Above Screening Level
TOX: Chemical is a Class A Carcinogen
DET: Relatively few chemicals detected at site, so comparison with screening levels and frequency of detection were not used to eliminate COPCs
NSL: No Screening Level
FD: Frequent Detection
CARC: Infrequent Detection but Chemical is a Carcinogen

Deletion Reason: BSL: Below Screening Level
BSL1: Infrequent Detection and Below Screening Level
NUT: Essential Nutrient
NTX: No Toxicity Information Available
IFD: Infrequent Detection

Definitions: NA: Not Available.
ND: Not Detected.
nc: Screening Toxicity Value is based on noncancer effects.
ca: Screening Toxicity Value is based on cancer effects.
COPC: Chemical of Potential Concern.
ARAR/TBC: Applicable or Relevant and Appropriate Requirement/To Be Considered
ug/m^3: microgram per cubic meter.

TABLE 3-8c Other Parcels - 5 to 30 feet bgs
OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - Soil Gas
Omega Chemical Site - Whittier, California

Scenario Timeframe:	Future
Medium:	Soil Gas - 5 to 30 ft bgs
Exposure Medium:	Ambient Air in Excavation

Exposure Point	CAS Number	Chemical	Minimum Concentration	Maximum Concentration	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limts	Concentration Used for Screening (1)	Background Value (2)	Screening Toxicity Value (nc/ca) (3)	Potential ARAR/TBC Value	Potential ARAR/TBC Source (4)	COPC Flag (Y/N)	Rationale for Selection or Deletion (5)
Soil Gas															
	71-55-6	1,1,1-TRICHLOROETHANE	142	251,160	ug/m3	OC-SG-018-VP08-081905	8 / 50	4.368 - 10374	2.5E+05	NA	2.8E+05			Yes	FD
	76-13-1	1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE	13	3,447,000	ug/m3	OC-SG-06-01-041204	57 / 59	7.66 - 12256	3.4E+06	NA				Yes	FD
	75-34-3	1,1-DICHLOROETHANE	486	8,910	ug/m3	OC-SG-006-VP02-082205	6 / 48	3.24 - 7695	8.9E+03	NA				Yes	FD
	75-35-4	1,1-DICHLOROETHENE	83	1,071,900	ug/m3	OC-SG-006-VP05-081705	55 / 59	3.97 - 6352	1.1E+06	NA				Yes	FD
	95-63-6	1,2,4-TRIMETHYLBENZENE	9	16	ug/m3	OC1-SG11A-G-0-24	5 / 49	3.936 - 9348	1.6E+01	NA				Yes	FD
		1,2-DICHLORO-1,1,2-TRIFLUOROETHANE	81,250	93,750	ug/m3	OC-SG-018-VP19-121305	2 / 2	NR - NR	9.4E+04	NA				Yes	FD
	106-99-0	1,3-BUTADIENE	3	139	ug/m3	OC-SG-06-03-041204	9 / 47	2.21 - 3536	1.4E+02	NA				Yes	FD
		2,2,4-TRIMETHYLPENTANE	5	1,541	ug/m3	OC-SG-024-VP06-081605, OC-SG-006-VP08-081905	13 / 50	4.67 - 7472	1.5E+03	NA				Yes	FD
	78-93-3	2-BUTANONE	4	174	ug/m3	OC-SG-029-VP30-060106	14 / 48	2.95 - 4720	1.7E+02	NA				Yes	FD
		2-PROPANOL	9,840	36,900	ug/m3	OC-SG-008-VP13-121205	3 / 46	9.84 - 16236	3.7E+04	NA				Yes	FD
		4-ETHYLTOLUENE	7	17	ug/m3	OC-SG-029-VP30-060106	3 / 47	4.92 - 7872	1.7E+01	NA				Yes	FD
		4-METHYL-2-PENTANONE	16	16	ug/m3	OC-SG-029-VP13-121205	1 / 45	4.1 - 6560	1.6E+01	NA				No	IFD1
	67-64-1	ACETONE	15	500	ug/m3	OC-SG-018-VP19-121305	20 / 51	9.52 - 15708	5.0E+02	NA				Yes	FD
	71-43-2	BENZENE	3	89	ug/m3	OC-SG-025-VP25-030606	14 / 51	3.19 - 6061	8.9E+01	NA	1.2E+01			Yes	FD
	75-27-4	BROMODICHLOROMETHANE	9	24	ug/m3	OC-SG-012-VP19-121305	4 / 46	6.7 - 10720	2.4E+01	NA				Yes	FD
	75-25-2	BROMOFORM	13	13	ug/m3	OC-SG-006-VP08-081905	1 / 45	10.34 - 16544	1.3E+01	NA				Yes	CARC
	75-15-0	CARBON DISULFIDE	3	26	ug/m3	OC-SG-018-VP03-081805	5 / 46	3.11 - 4976	2.6E+01	NA				Yes	FD
	67-66-3	CHLOROFORM	7	107,360	ug/m3	OC-SG-008-VP30-060106	17 / 52	3.904 - 9272	1.1E+05	NA				Yes	FD
	156-59-2	CIS-1,2-DICHLOROETHENE	713	13,068	ug/m3	OC-SG-010-VP26-053106	3 / 48	3.168 - 7524	1.3E+04	NA	4.4E+03			Yes	FD
	110-82-7	CYCLOHEXANE	4	963	ug/m3	OC-SG-006-VP08-081905	6 / 47	3.44 - 5504	9.6E+02	NA				Yes	FD
		DIBROMOCHLOROMETHANE	9	14	ug/m3	OC-SG-012-VP04-082205, OC-SG-006-VP11-081505	2 / 45	8.52 - 13632	1.4E+01	NA				Yes	CARC
	124-48-1														
	75-71-8	DICHLORODIFLUOROMETHANE	11	9,405	ug/m3	OC-SG-029-VP13-121205	16 / 51	3.96 - 7920	9.4E+03	NA				Yes	FD
		ETHANOL	13	254	ug/m3	OC-SG-018-VP10-081505, OC-SG-012-VP10-081505	7 / 47	7.52 - 12408	2.5E+02	NA				Yes	FD
	100-41-4	ETHYLBENZENE	6	20	ug/m3	OC-SG-008-VP13-121205	7 / 50	3.472 - 8246	2.0E+01	NA	0.0E+00			Yes	FD
		HEPTANE	5	98	ug/m3	OC-SG-010-VP26-053106	8 / 48	4.1 - 6560	9.8E+01	NA				Yes	FD
	110-54-3	HEXANE (N-HEXANE)	4	2,218	ug/m3	OC1-SG14A-G-0-28	16 / 49	3.52 - 5632	2.2E+03	NA				Yes	FD
		M,P-XYLENES	10	126	ug/m3	OC-SG-12-01-041204	16 / 51	4.34 - 16492	1.3E+02	NA	8.9E+04			Yes	FD
	1634-04-4	METHYL TERT-BUTYL ETHER	19	21	ug/m3	OC-SG-018-VP19-121305	2 / 46	3.61 - 5776	2.1E+01	NA	1.3E+03			Yes	CARC
	75-09-2	METHYLENE CHLORIDE	8	298	ug/m3	OC-SG-018-VP19-121305	7 / 48	2.776 - 6593	3.0E+02	NA				Yes	FD
	95-47-6	O-XYLENE	5	24	ug/m3	SG-8-18FT	8 / 50	3.472 - 8246	2.4E+01	NA	8.8E+04			Yes	FD
		PENTANE	21,535	21,535	ug/m3	OC-SG-006-VP11-081505	1 / 1	NR - NR	2.2E+04	NA				Yes	FD
	127-18-4	TETRACHLOROETHENE	12	2,101,800	ug/m3	OC-SG-029-VP25-030606	56 / 59	6.78 - 10848	2.1E+06	NA	6.0E+01			Yes	FD

TABLE 3-8c Other Parcels - 5 to 30 feet bgs
OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - Soil Gas
Omega Chemical Site - Whittier, California

Scenario Timeframe:	Future
Medium:	Soil Gas - 5 to 30 ft bgs
Exposure Medium:	Ambient Air in Excavation

Exposure Point	CAS Number	Chemical	Minimum Concentration	Maximum Concentration	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limts	Concentration Used for Screening (1)	Background Value (2)	Screening Toxicity Value (nc/ca) (3)	Potential ARAR/TBC Value	Potential ARAR/TBC Source (4)	COPC Flag (Y/N)	Rationale for Selection or Deletion (5)
	109-99-9	TETRAHYDROFURAN	3	4	ug/m^3	OC-SG-018-VP03-081805	2 / 45	2.95 - 4720	4.1E+00	NA				Yes	CARC
	108-88-3	TOLUENE	8	12,441	ug/m^3	OC-SG-018-VP08-081905	24 / 53	3.77 - 7163	1.2E+04	NA	3.8E+04			Yes	FD
	156-60-5	TRANS-1,2-DICHLOROETHENE	673	9,900	ug/m^3	OC-SG-008-VP13-121205	3 / 46	3.96 - 6336	9.9E+03	NA	8.9E+03			Yes	FD
	79-01-6	TRICHLOROETHENE	54	472,560	ug/m^3	OC-SG-006-VP08-081905	50 / 58	5.37 - 8592	4.7E+05	NA	1.8E+02			Yes	FD
	75-69-4	TRICHLOROFLUOROMETHANE (FREON 11)	6	1,011,600	ug/m^3	SG-8-18FT	58 / 59	5.62 - 8992	1.0E+06	NA				Yes	FD

(1) Maximum detected concentration from onsite samples
(2) Maximum detected background concentration.
(3) Screened against 1/10th EPA's Shallow Soil Gas Screening Levels for Human Health (Vapor Intrusion) for Commercial/Industrial Use (EPA 2005) to account for additivity of multiple chemicals.
(4) Rationale Codes:

Selection Reason: ASL: Above Screening Level
TOX: Chemical is a Class A Carcinogen
DET: Relatively few chemicals detected at site, so comparison with screening levels and frequency of detection were not used to eliminate COPCs
NSL: No Screening Level
FD: Frequent Detection
CARC: Infrequent Detection but Chemical is a Carcinogen
Deletion Reason: BSL: Below Screening Level
BSL1: Infrequent Detection and Below Screening Level
NUT: Essential Nutrient
NTX: No Toxicity Information Available
IFD: Infrequent Detection

Definitions: NA: Not Available.
ND: Not Detected.
nc: Screening Toxicity Value is based on noncancer effects.
ca: Screening Toxicity Value is based on cancer effects.
COPC: Chemical of Potential Concern.
ARAR/TBC: Applicable or Relevant and Appropriate Requirement/To Be Considered
ug/m^3: microgram per cubic meter.

Table 3-9
Summary of Detected Chemicals in Soil Gas 30+ feet bgs

Chemical	Detections			Detection Frequency		Reporting Limits	
	Minimum ug/m^3	Maximum ug/m^3	Maximum Location	Number of Detections	Total Samples	Minimum ug/m^3	Maximum ug/m^3
1,1,1-TRICHLOROETHANE	928	1,583,400	OC-SG-070-VP08-081905	43	82	4.26	60,060
1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE	8.43	4,289,600	OC-SG-058-VP18-121505	79	82	7.66	222,140
1,1-DICHLOROETHANE	25.52	76,950	OC-SG-040-VP05-081705	47	82	3.16	10,125
1,1-DICHLOROETHENE	4.76	3,453,900	OC-SG-051-VP14-121505	76	82	2.78	59,550
1,2,4-TRIMETHYLBENZENE	8.36	30	OC-SG-060-VP30-060106	9	82	4.92	12,300
1,2-DICHLORO-1,1,2-TRIFLUOROETHANE	20,000	68,750.0	OC-SG-050-VP19-121305	4	5	NR	NR
1,2-DICHLOROETHANE	223	141,750	OC-SG-070-VP06-081605	15	82	3.16	10,125
1,3,5-TRIMETHYLBENZENE	9.84	128	OC-SG-060-VP11-081505	2	82	3.84	12,300
1,3-BUTADIENE	9.28	204	OC-SG-060-VP27-053106	14	43	2.21	5,525
1,4-DIOXANE	23.4	23	OC-SG-036-VP25-030606	1	43	14.40	35,640
2,2,4-TRIMETHYLPENTANE	9.81	14,477	OC-SG-050-VP15-121405	14	43	4.67	11,675
2-BUTANONE	5.02	413	OC-SG-040-VP19-121305	17	82	2.95	7,375
2-HEXANONE	2,706	2,706	OC-SG-040-VP04-082205	1	82	6.56	40,590
2-PROPANOL	13	29,520	OC-SG-060-VP17-121205, OC-SG-056-VP13-121205, OC-SG-039-VP24-030606	10	43	9.84	24,354
4-ETHYLTOLUENE	6.4	24	OC-SG-070-VP19-121305	7	82	3.84	12,300
4-METHYL-2-PENTANONE	4.1	11	OC-SG-036-VP25-030606	2	82	4.10	10,250
ACETALDEHYDE	133	450	OC-SG-040-VP19-121305	3	3	NR	NR
ACETONE	24	34510	OC-SG-060-VP02-082205	55	82	2.38	23,562
BENZENE	12	7,975	OC-SG-040-VP05-081705	37	82	2.49	7,975
CARBON DISULFIDE	5.60	43,540	OC-SG-070-VP04-082205	46	82	2.43	7,775
CARBON TETRACHLORIDE	189	327.08	OC-SG-060-VP11-081505	2	82	4.91	15,725
CHLOROFORM	5.86	180,560	OC-SG-058-VP14-121505	53	82	3.81	19,520
CHLOROMETHANE	1.61	1.80	OC-SG-040-VP10-081505	2	82	1.61	20,493
CIS-1,2-DICHLOROETHENE	63	5,940	OC-SG-056-VP13-121205	13	82	3.09	9,900
CYCLOHEXANE	11	17544	OC-SG-050-VP15-121405	13	43	3.44	8,600
DICHLORODIFLUOROMETHANE	6.93	15,345	OC-SG-035-VP24-030606	11	82	3.86	12,375
ETHANOL	12	39	OC-SG-050-VP26-053106	9	43	7.52	18,612
ETHYLBENZENE	6.51	20	OC-SG-070-VP19-121305	7	82	3.39	10,850
HEPTANE	9.02	10,660	OC-SG-050-VP15-121405	17	43	4.10	10,250
HEXANE (N-HEXANE)	20	35,200	OC-SG-050-VP15-121405	20	43	3.52	8,800
M,P-XYLENES	13	694	OC-SG-060-VP11-081505	17	82	4.34	10,850
METHYL TERT-BUTYL ETHER	43	43	OC-SG-036-VP25-030606	1	82	3.61	10,469
METHYLENE CHLORIDE	4.86	62,460	OC-SG-060-VP03-082205	35	82	3.47	10,063
O-XYLENE	4.34	2,908	OC-SG-060-VP08-081905	14	82	3.39	10,850
PENTANE	268,450	268,450	OC-SG-050-VP15-121405	1	1	NR	NR
TETRACHLOROETHENE	11	6,102,000	OC-SG-058-VP14-121505	73	82	4.75	101,700
TOLUENE	4.9	7,163	OC-SG-056-VP13-121205	41	82	2.64	9,425
TRANS-1,2-DICHLOROETHENE	317	79,200	OC-SG-070-VP04-082205	36	82	3.09	9,900
TRICHLOROETHENE	35	590,700	OC-SG-058-VP14-121505	70	82	4.19	33,831
TRICHLOROFLUOROMETHANE (FREON 11)	7.87	843,000	OC-SG-050-VP02-082205	78	82	5.62	78,680
VINYL CHLORIDE	79	358	OC-SG-050-VP06-081605	3	82	2.00	6,400

NR - Not reported
ug/m^3 = microgram per cubic meter

TABLE 3-10 - Parcel Site - 3 Kings Construction
OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - Indoor Air
Omega Chemical Site - Whittier, California

Scenario Timeframe:	Current
Medium:	Indoor Air
Exposure Medium:	Indoor Air

Exposure Point	CAS Number	Chemical	Minimum Concentration	Maximum Concentration	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limts	Concentration Used for Screening (1)	Background Value (2)	Screening Toxicity Value (nc/ca) (3)	Potential ARAR/TBC Value	Potential ARAR/TBC Source (4)	COPC Flag (Y/N)	Rationale for Selection or Deletion (5)
Indoor Air															
	71-55-6	1,1,1-TRICHLOROETHANE	0.21	0.22	ug/m^3	OC-AA-FS-13-051104	2 / 4	0.180 - 0.51	2.2E-01	NA	3.2E+02			Yes	FD
	76-13-1	1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE	1.6	6.8	ug/m^3	OC-IA-FS-14-091405	4 / 4	0.260 - 0.72	6.8E+00	NA				Yes	FD
	75-35-4	1,1-DICHLOROETHENE	0.7	9.2	ug/m^3	OC-IA-FS-14-091405	4 / 4	0.066 - 0.18	9.2E+00	NA				Yes	FD
	67-64-1	ACETONE	24	50	ug/m^3	OC-IA-FS-14-091405	4 / 4	2.000 - 5.6	5.0E+01	NA				Yes	FD
	71-43-2	BENZENE	2.8	11	ug/m^3	OC-IA-FS-14-091405	4 / 4	0.270 - 0.75	1.1E+01	NA	1.4E-02			Yes	FD
	56-23-5	CARBON TETRACHLORIDE	0.57	0.65	ug/m^3	OC-IA-FS-14-091405	4 / 4	0.210 - 0.59	6.5E-01	NA	9.7E-03			Yes	FD
	67-66-3	CHLOROFORM	0.25	0.25	ug/m^3	OC-AA-FS-13-051104	1 / 4	0.160 - 0.46	2.5E-01	NA				Yes	FD
	75-71-8	DICHLORODIFLUOROMETHANE	1.4	3.1	ug/m^3	OC-IA-FS-14-091405	4 / 4	0.160 - 0.46	3.1E+00	NA				Yes	FD
	100-41-4	ETHYLBENZENE	3.2	16	ug/m^3	OC-IA-FS-14-091405	4 / 4	0.140 - 0.41	1.6E+01	NA	0.0E+00			Yes	FD
		M,P-XYLENES	14	82	ug/m^3	OC-IA-FS-14-091405	4 / 4	0.290 - 0.81	8.2E+01	NA	1.0E+02			Yes	FD
	75-09-2	METHYLENE CHLORIDE	1.8	260	ug/m^3	OC-IA-FS-14-091405	4 / 4	1.200 - 3.2	2.6E+02	NA				Yes	FD
	95-47-6	O-XYLENE	2.9	17	ug/m^3	OC-IA-FS-14-091405	4 / 4	0.140 - 0.41	1.7E+01	NA	1.0E+02			Yes	FD
	127-18-4	TETRACHLOROETHENE	1	13	ug/m^3	OC-IA-FS-14-091405	4 / 4	0.230 - 0.63	1.3E+01	NA	6.9E-02			Yes	FD
	108-88-3	TOLUENE	34	170	ug/m^3	OC-IA-FS-14-091405	4 / 4	0.120 - 0.35	1.7E+02	NA	4.4E+01			Yes	FD
	79-01-6	TRICHLOROETHENE	0.25	3.3	ug/m^3	OC-IA-FS-14-091405	4 / 4	0.180 - 0.5	3.3E+00	NA	2.0E-01			Yes	FD
	75-69-4	TRICHLOROFLUOROMETHANE (FREON 11)	2	5.9	ug/m^3	OC-IA-FS-14-091405	4 / 4	0.190 - 0.52	5.9E+00	NA				Yes	FD

(1) Maximum detected concentration used for screening.
(2) Maximum detected background concentration.
(3) Screened against 1/10th CalEPA's CHHSLs Indoor Air Screening Levels for Human Health Commercial/Industrial Use (EPA 2005) to account for additivity of multiple chemicals.
(4) Rationale Codes:

Selection Reason: ASL: Above Screening Level
TOX: Chemical is a Class A Carcinogen
DET: Relatively few chemicals detected at site, so comparison with screening levels and frequency of detection were not used to eliminate COPCs
NSL: No Screening Level
FD: Frequent Detection
CARC: Infrequent Detection but Chemical is a Carcinogen

Deletion Reason: BSL: Below Screening Level
BSL1: Infrequent Detection and Below Screening Level
NUT: Essential Nutrient
NTX: No Toxicity Information Available
IFD: Infrequent Detection

Definitions: NA: Not Available.
ND: Not Detected.
nc: Screening Toxicity Value is based on noncancer effects.
ca: Screening Toxicity Value is based on cancer effects.
COPC: Chemical of Potential Concern.
ARAR/TBC: Applicable or Relevant and Appropriate Requirement/To Be Considered
ug/m^3: microgram per cubic meter.

TABLE 3-11 - Parcel Site - Star City Auto Body
OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - Indoor Air
Omega Chemical Site - Whittier, California

Scenario Timeframe:	Current
Medium:	Indoor Air
Exposure Medium:	Indoor Air

Exposure Point	CAS Number	Chemical	Minimum Concentration	Maximum Concentration	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limts	Concentration Used for Screening (1)	Background Value (2)	Screening Toxicity Value (nc/ca) (3)	Potential ARAR/TBC Value	Potential ARAR/TBC Source (4)	COPC Flag (Y/N)	Rationale for Selection or Deletion (5)
Indoor Air															
	71-55-6	1,1,1-TRICHLOROETHANE	0.32	0.33	ug/m^3	OC-IA-FS-07-091405	1 / 4	0.190 - 18	3.3E-01	NA	3.2E+02			Yes	FD
	76-13-1	1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE	5.6	31	ug/m^3	OC-AA-FD-07-051104	3 / 4	0.270 - 26	3.1E+01	NA				Yes	FD
	75-35-4	1,1-DICHLOROETHENE	1.6	18	ug/m^3	OC-AA-FD-07-051104	3 / 4	0.069 - 6.7	1.8E+01	NA				Yes	FD
	67-64-1	ACETONE	330	6000	ug/m^3	OC-IA-FD-09-091405	4 / 4	2.100 - 200	6.0E+03	NA				Yes	FD
	71-43-2	BENZENE	2.6	5.3	ug/m^3	OC-IA-FS-07-091405	2 / 4	0.280 - 27	5.3E+00	NA	1.4E-02			Yes	FD
	56-23-5	CARBON TETRACHLORIDE	0.66	0.67	ug/m^3	OC-IA-FS-07-091405	1 / 4	0.220 - 21	6.7E-01	NA	9.7E-03			Yes	FD
	67-66-3	CHLOROFORM	0.19	0.19	ug/m^3	FS-07-091405,OC-IA-FD-07-	1 / 4	0.170 - 16	1.9E-01	NA				Yes	FD
	75-71-8	DICHLORODIFLUOROMETHANE	1.9	2.7	ug/m^3	OC-AA-FD-07-051104	2 / 4	0.170 - 17	2.7E+00	NA				Yes	FD
	100-41-4	ETHYLBENZENE	4.6	48	ug/m^3	OC-AA-FS-09-051104	3 / 4	0.150 - 14	4.8E+01	NA	0.0E+00			Yes	FD
		M,P-XYLENES	21	270	ug/m^3	OC-AA-FS-09-051104	3 / 4	0.300 - 29	2.7E+02	NA	1.0E+02			Yes	FD
	75-09-2	METHYLENE CHLORIDE	1.5	4.8	ug/m^3	OC-AA-FD-07-051104	1 / 4	1.200 - 120	4.8E+00	NA				Yes	FD
	95-47-6	O-XYLENE	5.1	78	ug/m^3	OC-AA-FS-09-051104	3 / 4	0.150 - 14	7.8E+01	NA	1.0E+02			Yes	FD
	127-18-4	TETRACHLOROETHENE	6	34	ug/m^3	OC-IA-FS-07-091405	3 / 4	0.240 - 23	3.4E+01	NA	6.9E-02			Yes	FD
	108-88-3	TOLUENE	36	2400	ug/m^3	OC-AA-FS-09-051104	4 / 4	0.130 - 13	2.4E+03	NA	4.4E+01			Yes	FD
	79-01-6	TRICHLOROETHENE	3.5	6.5	ug/m^3	OC-IA-FS-07-091405	2 / 4	0.190 - 18	6.5E+00	NA	2.0E-01			Yes	FD
	75-69-4	TRICHLOROFLUOROMETHANE (FREON 11)	11	14	ug/m^3	OC-AA-FD-07-051104	2 / 4	0.200 - 19	1.4E+01	NA				Yes	FD

(1) Maximum detected concentration used for screening.
(2) Maximum detected background concentration.
(3) Screened against 1/10th CalEPA's CHHSLs Indoor Air Screening Levels for Human Health Commercial/Industrial Use (EPA 2005) to account for additivity of multiple chemicals.
(4) Rationale Codes:

Selection Reason: ASL: Above Screening Level
TOX: Chemical is a Class A Carcinogen
DET: Relatively few chemicals detected at site, so comparison with screening levels and frequency of detection were not used to eliminate COPCs
NSL: No Screening Level
FD: Frequent Detection
CARC: Infrequent Detection but Chemical is a Carcinogen

Deletion Reason: BSL: Below Screening Level
BSL1: Infrequent Detection and Below Screening Level
NUT: Essential Nutrient
NTX: No Toxicity Information Available

Definitions: NA: Not Available.
ND: Not Detected.
nc: Screening Toxicity Value is based on noncancer effects.
ca: Screening Toxicity Value is based on cancer effects.
COPC: Chemical of Potential Concern.
ARAR/TBC: Applicable or Relevant and Appropriate Requirement/To Be Considered
ug/m^3: microgram per cubic meter.

TABLE 3-12 - Parcel North - Medlin & Sons 12484
OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - Indoor Air
Omega Chemical Site - Whittier, California

Scenario Timeframe:	Current
Medium:	Indoor Air
Exposure Medium:	Indoor Air

Exposure Point	CAS Number	Chemical	Minimum Concentration	Maximum Concentration	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limts	Concentration Used for Screening (1)	Background Value (2)	Screening Toxicity Value (nc/ca) (3)	Potential ARAR/TBC Value	Potential ARAR/TBC Source (4)	COPC Flag (Y/N)	Rationale for Selection or Deletion (5)
Indoor Air															
	71-55-6	1,1,1-TRICHLOROETHANE	0.21	0.21	ug/m^3	OC-AA-FS-11-051104	1 / 4	0.180 - 0.46	2.1E-01	NA	3.2E+02			Yes	FD
	76-13-1	1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE	17	40	ug/m^3	OC-AA-FS-10-051104	4 / 4	0.250 - 0.65	4.0E+01	NA				Yes	FD
	75-35-4	1,1-DICHLOROETHENE	2.9	10	ug/m^3	OC-AA-FS-10-091405	4 / 4	0.064 - 0.17	1.0E+01	NA				Yes	FD
	106-46-7	1,4-DICHLOROBENZENE	0.2	0.95	ug/m^3	OC-AA-FS-10-051104	2 / 4	0.190 - 0.51	9.5E-01	NA				Yes	FD
	67-64-1	ACETONE	22	3400	ug/m^3	OC-AA-FS-10-051104	4 / 4	1.900 - 5.1	3.4E+03	NA				Yes	FD
	71-43-2	BENZENE	0.91	1.1	ug/m^3	OC-AA-FS-11-051104	4 / 4	0.260 - 0.68	1.1E+00	NA	1.4E-02			Yes	FD
	56-23-5	CARBON TETRACHLORIDE	0.67	1.3	ug/m^3	OC-AA-FS-11-091405	4 / 4	0.200 - 0.54	1.3E+00	NA	9.7E-03			Yes	FD
	67-66-3	CHLOROFORM	0.2	0.32	ug/m^3	OC-AA-FS-11-091405	3 / 4	0.160 - 0.42	3.2E-01	NA				Yes	FD
	75-71-8	DICHLORODIFLUOROMETHANE	1.2	3.3	ug/m^3	OC-AA-FS-11-051104	4 / 4	0.160 - 0.42	3.3E+00	NA				Yes	FD
	100-41-4	ETHYLBENZENE	0.72	0.85	ug/m^3	OC-AA-FS-11-051104	4 / 4	0.140 - 0.37	8.5E-01	NA	0.0E+00			Yes	FD
		M,P-XYLENES	2.2	2.7	ug/m^3	OC-AA-FS-11-051104, OC-AA-FS-11-091405	4 / 4	0.280 - 0.74	2.7E+00	NA	1.0E+02			Yes	FD
	75-09-2	METHYLENE CHLORIDE	1.7	5.1	ug/m^3	OC-AA-FS-11-051104	3 / 4	1.100 - 3	5.1E+00	NA				Yes	FD
	95-47-6	O-XYLENE	0.87	1	ug/m^3	OC-AA-FS-11-051104	4 / 4	0.140 - 0.37	1.0E+00	NA	1.0E+02			Yes	FD
	127-18-4	TETRACHLOROETHENE	4.3	22	ug/m^3	OC-AA-FS-10-091405	4 / 4	0.220 - 0.58	2.2E+01	NA	6.9E-02			Yes	FD
	108-88-3	TOLUENE	4.8	7.4	ug/m^3	OC-AA-FS-10-091405	4 / 4	0.120 - 0.32	7.4E+00	NA	4.4E+01			Yes	FD
	79-01-6	TRICHLOROETHENE	2.3	14	ug/m^3	OC-AA-FS-10-091405	4 / 4	0.170 - 0.46	1.4E+01	NA	2.0E-01			Yes	FD
	75-69-4	TRICHLOROFLUOROMETHANE (FREON 11)	5.4	12	ug/m^3	OC-AA-FS-10-091405	4 / 4	0.180 - 0.48	1.2E+01	NA				Yes	FD

(1) Maximum detected concentration used for screening.
(2) Maximum detected background concentration.
(3) Screened against 1/10th CalEPA's CHHSLs Indoor Air Screening Levels for Human Health Commercial/Industrial Use (EPA 2005) to account for additivity of multiple chemicals.
(4) Rationale Codes:

Selection Reason: ASL: Above Screening Level
TOX: Chemical is a Class A Carcinogen
DET: Relatively few chemicals detected at site, so comparison with screening levels and frequency of detection were not used to eliminate COPCs
NSL: No Screening Level
FD: Frequent Detection
CARC: Infrequent Detection but Chemical is a Carcinogen

Deletion Reason: BSL: Below Screening Level
BSL1: Infrequent Detection and Below Screening Level
NUT: Essential Nutrient
NTX: No Toxicity Information Available

Definitions: NA: Not Available.
ND: Not Detected.
nc: Screening Toxicity Value is based on noncancer effects.
ca: Screening Toxicity Value is based on cancer effects.
COPC: Chemical of Potential Concern.
ARAR/TBC: Applicable or Relevant and Appropriate Requirement/To Be Considered
ug/m^3: microgram per cubic meter.

TABLE 3-13- Parcel North - Medlin & Sons North 12476
OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - Indoor Air
Omega Chemical Site - Whittier, California

Scenario Timeframe:	Current
Medium:	Indoor Air
Exposure Medium:	Indoor Air

Exposure Point	CAS Number	Chemical	Minimum Concentration	Maximum Concentration	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limts	Concentration Used for Screening (1)	Background Value (2)	Screening Toxicity Value (nc/ca) (3)	Potential ARAR/TBC Value	Potential ARAR/TBC Source (4)	COPC Flag (Y/N)	Rationale for Selection or Deletion (5)
Indoor Air															
	76-13-1	1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE	1.9	1.9	ug/m^3	IA-37	1 / 1	1.8 - 1.8	1.9E+00	NA				Yes	FD
	67-64-1	ACETONE	430	430	ug/m^3	IA-37	1 / 1	14 - 14	4.3E+02	NA				Yes	FD
	75-71-8	DICHLORODIFLUOROMETHANE	2.6	2.6	ug/m^3	IA-37	1 / 1	1.2 - 1.2	2.6E+00	NA				Yes	FD
	108-88-3	TOLUENE	2.8	2.8	ug/m^3	IA-37	1 / 1	0.9 - 0.9	2.8E+00	NA	4.4E+01			Yes	FD
	75-69-4	TRICHLOROFLUOROMETHANE (FREON 11)	1.6	1.6	ug/m^3	IA-37	1 / 1	1.3 - 1.3	1.6E+00	NA				Yes	FD

(1) Maximum detected concentration used for screening.
(2) Maximum detected background concentration.
(3) Screened against 1/10th CalEPA's CHHSLs Indoor Air Screening Levels for Human Health Commercial/Industrial Use (EPA 2005) to account for additivity of multiple chemicals.
(4) Rationale Codes:

Selection Reason: ASL: Above Screening Level
TOX: Chemical is a Class A Carcinogen
DET: Relatively few chemicals detected at site, so comparison with screening levels and frequency of detection were not used to eliminate COPCs
NSL: No Screening Level
FD: Frequent Detection
CARC: Infrequent Detection but Chemical is a Carcinogen

Deletion Reason: BSL: Below Screening Level
BSL1: Infrequent Detection and Below Screening Level
NUT: Essential Nutrient
NTX: No Toxicity Information Available

Definitions: NA: Not Available.
ND: Not Detected.
nc: Screening Toxicity Value is based on noncancer effects.
ca: Screening Toxicity Value is based on cancer effects.
COPC: Chemical of Potential Concern.
ARAR/TBC: Applicable or Relevant and Appropriate Requirement/To Be Considered
ug/m^3: microgram per cubic meter.

TABLE 3-14 - Parcel West - Terrapave
OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - Indoor Air
Omega Chemical Site - Whittier, California

Scenario Timeframe:	Current
Medium:	Indoor Air
Exposure Medium:	Indoor Air

Exposure Point	CAS Number	Chemical	Minimum Concentration	Maximum Concentration	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limts	Concentration Used for Screening (1)	Background Value (2)	Screening Toxicity Value (nc/ca) (3)	Potential ARAR/TBC Value	Potential ARAR/TBC Source (4)	COPC Flag (Y/N)	Rationale for Selection or Deletion (5)
Indoor Air															
	71-55-6	1,1,1-TRICHLOROETHANE	0.45	0.49	ug/m^3	OC-AA-FS-06-051104	2 / 4	0.170 - 0.2	4.9E-01	NA	3.2E+02			Yes	FD
	76-13-1	1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE	6.3	26	ug/m^3	OC-AA-FS-06-051104, OC-AA-FS-05-051104	4 / 4	0.240 - 0.28	2.6E+01	NA				Yes	FD
	75-35-4	1,1-DICHLOROETHENE	5.5	23	ug/m^3	OC-AA-FS-05-051104	4 / 4	0.063 - 0.072	2.3E+01	NA				Yes	FD
	106-46-7	1,4-DICHLOROBENZENE	0.23	0.27	ug/m^3	OC-IA-FD-05-091405	2 / 4	0.190 - 0.22	2.7E-01	NA				Yes	FD
	67-64-1	ACETONE	22	43	ug/m^3	OC-AA-FS-06-051104	4 / 4	1.900 - 2.2	4.3E+01	NA				Yes	FD
	71-43-2	BENZENE	1.1	1.4	ug/m^3	OC-AA-FS-06-051104	4 / 4	0.250 - 0.29	1.4E+00	NA	1.4E-02			Yes	FD
	56-23-5	CARBON TETRACHLORIDE	0.56	0.67	ug/m^3	OC-IA-FD-05-091405	4 / 4	0.200 - 0.23	6.7E-01	NA	9.7E-03			Yes	FD
	67-66-3	CHLOROFORM	0.21	0.24	ug/m^3	OC-AA-FS-05-051104	4 / 4	0.150 - 0.18	2.4E-01	NA				Yes	FD
	75-71-8	DICHLORODIFLUOROMETHANE	1.5	2.9	ug/m^3	OC-AA-FS-05-051104	4 / 4	0.160 - 0.18	2.9E+00	NA				Yes	FD
	100-41-4	ETHYLBENZENE	0.93	1.6	ug/m^3	OC-AA-FS-05-051104	4 / 4	0.140 - 0.16	1.6E+00	NA	0.0E+00			Yes	FD
		M,P-XYLENES	3.3	5.5	ug/m^3	OC-AA-FS-06-051104	4 / 4	0.270 - 0.32	5.5E+00	NA	1.0E+02			Yes	FD
	75-09-2	METHYLENE CHLORIDE	1.2	1.5	ug/m^3	OC-AA-FS-05-051104	4 / 4	1.100 - 1.3	1.5E+00	NA				Yes	FD
	95-47-6	O-XYLENE	0.96	2.1	ug/m^3	OC-AA-FS-05-051104, OC-AA-FS-06-051104	4 / 4	0.140 - 0.16	2.1E+00	NA	1.0E+02			Yes	FD
	127-18-4	TETRACHLOROETHENE	39	110	ug/m^3	OC-AA-FS-05-051104	4 / 4	0.210 - 0.25	1.1E+02	NA	6.9E-02			Yes	FD
	108-88-3	TOLUENE	6.5	10.0	ug/m^3	OC-AA-FS-05-051104	4 / 4	0.120 - 0.14	1.0E+01	NA	4.4E+01			Yes	FD
	79-01-6	TRICHLOROETHENE	1.6	4.4	ug/m^3	OC-AA-FS-05-051104	4 / 4	0.170 - 0.2	4.4E+00	NA	2.0E-01			Yes	FD
	75-69-4	TRICHLOROFLUOROMETHANE (FREON 11)	3.4	7	ug/m^3	OC-AA-FS-05-051104	4 / 4	0.180 - 0.2	7.0E+00	NA				Yes	FD

(1) Maximum detected concentration used for screening.
(2) Maximum detected background concentration.
(3) Screened against 1/10th CalEPA's CHHSLs Indoor Air Screening Levels for Human Health Commercial/Industrial Use (EPA 2005) to account for additivity of multiple chemicals.
(4) Rationale Codes:

Selection Reason: ASL: Above Screening Level
TOX: Chemical is a Class A Carcinogen
DET: Relatively few chemicals detected at site, so comparison with screening levels and frequency of detection were not used to eliminate COPCs
NSL: No Screening Level
FD: Frequent Detection
CARC: Infrequent Detection but Chemical is a Carcinogen

Deletion Reason: BSL: Below Screening Level
BSL1: Infrequent Detection and Below Screening Level
NUT: Essential Nutrient
NTX: No Toxicity Information Available
IFD: Infrequent Detection

Definitions: NA: Not Available.
ND: Not Detected.
nc: Screening Toxicity Value is based on noncancer effects.
ca: Screening Toxicity Value is based on cancer effects.
COPC: Chemical of Potential Concern.
ARAR/TBC: Applicable or Relevant and Appropriate Requirement/To Be Considered
ug/m^3: microgram per cubic meter.

TABLE 3-15 - Parcel South - Bishop
OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - Indoor Air
Omega Chemical Site - Whittier, California

Scenario Timeframe:	Current
Medium:	Indoor Air
Exposure Medium:	Indoor Air

Exposure Point	CAS Number	Chemical	Minimum Concentration	Maximum Concentration	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limts	Concentration Used for Screening (1)	Background Value (2)	Screening Toxicity Value (nc/ca) (3)	Potential ARAR/TBC Value	Potential ARAR/TBC Source (4)	COPC Flag (Y/N)	Rationale for Selection or Deletion (5)
Indoor Air															
	71-55-6	1,1,1-TRICHLOROETHANE	0.19	0.19	ug/m^3	OC-IA-BIS-STORE-090806	1 / 3	0.160 - 0.34	1.9E-01	NA	3.2E+02			Yes	FD
	76-13-1	1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE	3.4	10	ug/m^3	OC-IA-BIS-STORE-090806	3 / 3	0.230 - 0.48	1.0E+01	NA				Yes	FD
	75-35-4	1,1-DICHLOROETHENE	3.6	14	ug/m^3	OC-IA-BIS-STORE-090806	3 / 3	0.059 - 0.12	1.4E+01	NA				Yes	FD
	106-46-7	1,4-DICHLOROBENZENE	0.21	0.32	ug/m^3	OC-IA-BIS-AO-090806	2 / 3	0.180 - 0.37	3.2E-01	NA				Yes	FD
	67-64-1	ACETONE	28	41	ug/m^3	OC-IA-BIS-AO-090806	3 / 3	1.800 - 3.7	4.1E+01	NA				Yes	FD
	71-43-2	BENZENE	1.15	1.2	ug/m^3	OC-IA-BIS-STORE-090806	3 / 3	0.240 - 0.5	1.2E+00	NA	1.4E-02			Yes	FD
	56-23-5	CARBON TETRACHLORIDE	0.51	0.575	ug/m^3	OC-IA-BIS-AO-090806	3 / 3	0.190 - 0.39	5.8E-01	NA	9.7E-03			Yes	FD
	67-66-3	CHLOROFORM	0.15	0.18	ug/m^3	OC-IA-BIS-STORE-090806	2 / 3	0.140 - 0.3	1.8E-01	NA				Yes	FD
	75-71-8	DICHLORODIFLUOROMETHANE	2.7	3	ug/m^3	OC-IA-BIS-AO-090806	3 / 3	0.150 - 0.31	3.0E+00	NA				Yes	FD
	100-41-4	ETHYLBENZENE	0.81	1.7	ug/m^3	OC-IA-BIS-STORE-090806	3 / 3	0.130 - 0.27	1.7E+00	NA				Yes	FD
		M,P-XYLENES	2.7	4.9	ug/m^3	OC-IA-BIS-STORE-090806	3 / 3	0.260 - 0.54	4.9E+00	NA	1.0E+02			Yes	FD
	1634-04-4	METHYL TERT-BUTYL ETHER	0.67	0.67	ug/m^3	OC-IA-BIS-STORE-090806	1 / 3	0.540 - 1.1	6.7E-01	NA	1.6E+00			Yes	FD
	75-09-2	METHYLENE CHLORIDE	1	1.7	ug/m^3	OC-IA-BIS-STORE-090806	2 / 3	1.000 - 2.2	1.7E+00	NA				Yes	FD
	95-47-6	O-XYLENE	1.015	1.7	ug/m^3	OC-IA-BIS-STORE-090806	3 / 3	0.130 - 0.27	1.7E+00	NA	1.0E+02			Yes	FD
	127-18-4	TETRACHLOROETHENE	7.1	29.0	ug/m^3	OC-IA-BIS-STORE-090806	3 / 3	0.200 - 0.42	2.9E+01	NA	6.9E-02			Yes	FD
	108-88-3	TOLUENE	6.9	8.4	ug/m^3	OC-IA-BIS-STORE-090806	3 / 3	0.110 - 0.23	8.4E+00	NA	4.4E+01			Yes	FD
	79-01-6	TRICHLOROETHENE	0.44	1.5	ug/m^3	OC-IA-BIS-STORE-090806	3 / 3	0.160 - 0.33	1.5E+00	NA	2.0E-01			Yes	FD
	75-69-4	TRICHLOROFLUOROMETHANE (FREON 11)	2.2	3.7	ug/m^3	OC-IA-BIS-STORE-090806	3 / 3	0.170 - 0.35	3.7E+00	NA				Yes	FD

(1) Maximum detected concentration used for screening.
(2) Maximum detected background concentration.
(3) Screened against 1/10th CalEPA's CHHSLs Indoor Air Screening Levels for Human Health Commercial/Industrial Use (EPA 2005) to account for additivity of multiple chemicals.
(4) Rationale Codes:

Selection Reason: ASL: Above Screening Level
TOX: Chemical is a Class A Carcinogen
DET: Relatively few chemicals detected at site, so comparison with screening levels and frequency of detection were not used to eliminate COPCs
NSL: No Screening Level
FD: Frequent Detection
CARC: Infrequent Detection but Chemical is a Carcinogen

Deletion Reason: BSL: Below Screening Level
BSL1: Infrequent Detection and Below Screening Level
NUT: Essential Nutrient
NTX: No Toxicity Information Available
IFD: Infrequent Detection

Definitions: NA: Not Available.
ND: Not Detected.
nc: Screening Toxicity Value is based on noncancer effects.
ca: Screening Toxicity Value is based on cancer effects.
COPC: Chemical of Potential Concern.
ARAR/TBC: Applicable or Relevant and Appropriate Requirement/To Be Considered
ug/m^3: microgram per cubic meter.

TABLE 3-16 - Parcel South - LA Carts
OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - Indoor Air
Omega Chemical Site - Whittier, California

Scenario Timeframe:	Current
Medium:	Indoor Air
Exposure Medium:	Indoor Air

Exposure Point	CAS Number	Chemical	Minimum Concentration	Maximum Concentration	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limts	Concentration Used for Screening (1)	Background Value (2)	Screening Toxicity Value (nc/ca) (3)	Potential ARAR/TBC Value	Potential ARAR/TBC Source (4)	COPC Flag (Y/N)	Rationale for Selection or Deletion (5)
Indoor Air															
	76-13-1	1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE	0.7	14	ug/m^3	OC-IA-LAC-Sm Prod-090806	3 / 3	0.200 - 1.2	1.4E+01	NA				Yes	FD
	75-35-4	1,1-DICHLOROETHENE	0.06	3.6	ug/m^3	OC-IA-LAC-Sm Prod-090806	3 / 3	0.053 - 0.32	3.6E+00	NA				Yes	FD
	106-46-7	1,4-DICHLOROBENZENE	0.16	0.16	ug/m^3	OC-IA-LAC-AO-090806	1 / 3	0.160 - 0.99	1.6E-01	NA				Yes	FD
	67-64-1	ACETONE	74	1200	ug/m^3	OC-IA-LAC-Sm Prod-090806	3 / 3	1.600 - 9.7	1.2E+03	NA				Yes	FD
	71-43-2	BENZENE	1.3	2.2	ug/m^3	OC-IA-LAC-Lg Prod-090806	3 / 3	0.210 - 1.3	2.2E+00	NA	1.4E-02			Yes	FD
	56-23-5	CARBON TETRACHLORIDE	0.5	0.52	ug/m^3	OC-IA-LAC-Lg Prod-090806	2 / 3	0.170 - 1	5.2E-01	NA	9.7E-03			Yes	FD
	67-66-3	CHLOROFORM	0.14	0.37	ug/m^3	OC-IA-LAC-Lg Prod-090806	2 / 3	0.130 - 0.8	3.7E-01	NA				Yes	FD
	75-71-8	DICHLORODIFLUOROMETHANE	2.6	3.2	ug/m^3	OC-IA-LAC-Lg Prod-090806	3 / 3	0.130 - 0.81	3.2E+00	NA				Yes	FD
	100-41-4	ETHYLBENZENE	0.95	2	ug/m^3	OC-IA-LAC-Lg Prod-090806	3 / 3	0.120 - 0.71	2.0E+00	NA				Yes	FD
		M,P-XYLENES	2.9	7.3	ug/m^3	OC-IA-LAC-Lg Prod-090806	3 / 3	0.230 - 1.4	7.3E+00	NA	1.0E+02			Yes	FD
	75-09-2	METHYLENE CHLORIDE	5.2	5.9	ug/m^3	OC-IA-LAC-Lg Prod-090806	2 / 3	0.930 - 5.7	5.9E+00	NA				Yes	FD
	95-47-6	O-XYLENE	1	2.6	ug/m^3	OC-IA-LAC-Lg Prod-090806	3 / 3	0.120 - 0.71	2.6E+00	NA	1.0E+02			Yes	FD
	127-18-4	TETRACHLOROETHENE	0.24	1.6	ug/m^3	OC-IA-LAC-Lg Prod-090806	2 / 3	0.180 - 1.1	1.6E+00	NA	6.9E-02			Yes	FD
	108-88-3	TOLUENE	10	570	ug/m^3	OC-IA-LAC-Sm Prod-090806	3 / 3	0.100 - 0.62	5.7E+02	NA	4.4E+01			Yes	FD
	79-01-6	TRICHLOROETHENE	1.2	1.2	ug/m^3	OC-IA-LAC-AO-090806	1 / 3	0.140 - 0.88	1.2E+00	NA	2.0E-01			Yes	FD
	75-69-4	TRICHLOROFLUOROMETHANE (FREON 11)	1.5	3.2	ug/m^3	OC-IA-LAC-Sm Prod-090806	3 / 3	0.150 - 0.92	3.2E+00	NA				Yes	FD

(1) Maximum detected concentration used for screening.
(2) Maximum detected background concentration.
(3) Screened against 1/10th CalEPA's CHHSLs Indoor Air Screening Levels for Human Health Commercial/Industrial Use (EPA 2005) to account for additivity of multiple chemicals.
(4) Rationale Codes:

Selection Reason: ASL: Above Screening Level
TOX: Chemical is a Class A Carcinogen
DET: Relatively few chemicals detected at site, so comparison with screening levels and frequency of detection were not used to eliminate COPCs
NSL: No Screening Level
FD: Frequent Detection
CARC: Infrequent Detection but Chemical is a Carcinogen

Deletion Reason: BSL: Below Screening Level
BSL1: Infrequent Detection and Below Screening Level
NUT: Essential Nutrient
NTX: No Toxicity Information Available
IFD: Infrequent Detection

Definitions: NA: Not Available.
ND: Not Detected.
nc: Screening Toxicity Value is based on noncancer effects.
ca: Screening Toxicity Value is based on cancer effects.
COPC: Chemical of Potential Concern.
ARAR/TBC: Applicable or Relevant and Appropriate Requirement/To Be Considered
ug/m^3: microgram per cubic meter.

TABLE 3-17 - Parcel South - Oncology Care
OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - Indoor Air
Omega Chemical Site - Whittier, California

Scenario Timeframe:	Current
Medium:	Indoor Air
Exposure Medium:	Indoor Air

Exposure Point	CAS Number	Chemical	Minimum Concentration	Maximum Concentration	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limts	Concentration Used for Screening (1)	Background Value (2)	Screening Toxicity Value (nc/ca) (3)	Potential ARAR/TBC Value	Potential ARAR/TBC Source (4)	COPC Flag (Y/N)	Rationale for Selection or Deletion (5)
Indoor Air															
	76-13-1	1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE	1.2	1.6	ug/m^3	OC-IA-ONC-NS-090806	2 / 2	0.480 - 0.49	1.6E+00	NA				Yes	FD
	75-35-4	1,1-DICHLOROETHENE	0.2	0.23	ug/m^3	OC-IA-ONC-NS-090806	2 / 2	0.120 - 0.13	2.3E-01	NA				Yes	FD
	107-06-2	1,2-DICHLOROETHANE	0.32	0.32	ug/m^3	OC-IA-ONC-NS-090806	1 / 2	0.260 - 0.26	3.2E-01	NA	2.0E-02			Yes	FD
	106-46-7	1,4-DICHLOROBENZENE	0.39	0.39	ug/m^3	OC-IA-ONC-NS-090806	1 / 2	0.380 - 0.39	3.9E-01	NA				Yes	FD
	67-64-1	ACETONE	95	99	ug/m^3	OC-IA-ONC-NS-090806	2 / 2	3.800 - 3.8	9.9E+01	NA				Yes	FD
	71-43-2	BENZENE	1.1	1.2	ug/m^3	OC-IA-ONC-AO-090806	2 / 2	0.500 - 0.51	1.2E+00	NA	1.4E-02			Yes	FD
	56-23-5	CARBON TETRACHLORIDE	0.5	0.52	ug/m^3	OC-IA-ONC-AO-090806	2 / 2	0.400 - 0.4	5.2E-01	NA	9.7E-03			Yes	FD
	67-66-3	CHLOROFORM	0.57	0.66	ug/m^3	OC-IA-ONC-AO-090806	2 / 2	0.310 - 0.31	6.6E-01	NA				Yes	FD
	75-71-8	DICHLORODIFLUOROMETHANE	2.9	3.4	ug/m^3	OC-IA-ONC-NS-090806	2 / 2	0.310 - 0.32	3.4E+00	NA				Yes	FD
	100-41-4	ETHYLBENZENE	0.94	1	ug/m^3	OC-IA-ONC-AO-090806	2 / 2	0.270 - 0.28	1.0E+00	NA				Yes	FD
		M,P-XYLENES	3	3.1	ug/m^3	OC-IA-ONC-NS-090806	2 / 2	0.550 - 0.56	3.1E+00	NA	1.0E+02			Yes	FD
	95-47-6	O-XYLENE	1.2	1.3	ug/m^3	OC-IA-ONC-NS-090806	2 / 2	0.270 - 0.28	1.3E+00	NA	1.0E+02			Yes	FD
	127-18-4	TETRACHLOROETHENE	0.44	0.44	ug/m^3	OC-IA-ONC-NS-090806	1 / 2	0.430 - 0.44	4.4E-01	NA	6.9E-02			Yes	FD
	108-88-3	TOLUENE	16	17	ug/m^3	OC-IA-ONC-NS-090806	2 / 2	0.240 - 0.24	1.7E+01	NA	4.4E+01			Yes	FD
	75-69-4	TRICHLOROFLUOROMETHANE (FREON 11)	1.7	1.8	ug/m^3	OC-IA-ONC-NS-090806	2 / 2	0.360 - 0.36	1.8E+00	NA				Yes	FD

(1) Maximum detected concentration used for screening.
(2) Maximum detected background concentration.
(3) Screened against 1/10th CalEPA's CHHSLs Indoor Air Screening Levels for Human Health Commercial/Industrial Use (EPA 2005) to account for additivity of multiple chemicals.
(4) Rationale Codes:

Selection Reason: ASL: Above Screening Level
TOX: Chemical is a Class A Carcinogen
DET: Relatively few chemicals detected at site, so comparison with screening levels and frequency of detection were not used to eliminate COPCs
NSL: No Screening Level
FD: Frequent Detection
CARC: Infrequent Detection but Chemical is a Carcinogen

Deletion Reason: BSL: Below Screening Level
BSL1: Infrequent Detection and Below Screening Level
NUT: Essential Nutrient
NTX: No Toxicity Information Available
IFD: Infrequent Detection

Definitions: NA: Not Available.
ND: Not Detected.
nc: Screening Toxicity Value is based on noncancer effects.
ca: Screening Toxicity Value is based on cancer effects.
COPC: Chemical of Potential Concern.
ARAR/TBC: Applicable or Relevant and Appropriate Requirement/To Be Considered
ug/m^3: microgram per cubic meter.

TABLE 3-18 - All Parcels
OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - Ambient Air
Omega Chemical Site - Whittier, California

Scenario Timeframe:	Current
Medium:	Ambient Air
Exposure Medium:	Ambient Air

Exposure Point	CAS Number	Chemical	Minimum Concentration	Maximum Concentration	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limts	Concentration Used for Screening (1)	Background Value (2)	Screening Toxicity Value (nc/ca) (3)	Potential ARAR/TBC Value	Potential ARAR/TBC Source (4)	COPC Flag (Y/N)	Rationale for Selection or Deletion (5)
Ambient Air															
	71-55-6	1,1,1-TRICHLOROETHANE	1.1466	1.1466	ug/m3	OC-AA-FS-08-051104	1 / 12	0.158 - 0.9828	1.1E+00	NA	2.3E+02 nc			Yes	FD
	79-34-5	1,1,2,2-TETRACHLOROETHANE	0.3916	0.3916	ug/m3	OC-AA-FS-03-051104	1 / 12	0.199 - 1.2366	3.9E-01	NA	3.3E-03 ca			Yes	FD
	76-13-1	1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE	0.7124	1.7618	ug/m3	OC-AA-FS-08-051104	7 / 12	0.222 - 1.3788	1.8E+00	NA	3.1E+03 nc			Yes	FD
	75-35-4	1,1-DICHLOROETHENE	0.131	0.6352	ug/m3	OC-AA-FS-08-051104	6 / 12	0.060 - 0.36524	6.4E-01	NA	2.1E+01 nc			Yes	FD
	95-50-1	1,2-DICHLOROBENZENE	0.2945	0.2945	ug/m3	OC-AA-FS-03-051104	1 / 12	0.174 - 1.0818	2.9E-01	NA	2.1E+01 nc			Yes	FD
	106-46-7	1,4-DICHLOROBENZENE	0.3907	0.3907	ug/m3	OC-AA-FS-03-051104	1 / 12	0.174 - 1.0818	3.9E-01	NA	3.1E-02 ca			Yes	FD
	67-64-1	ACETONE	14.28	3808	ug/m3	OC-AA-FS-15-051104	8 / 11	1.737 - 10.948	3.8E+03	NA	3.3E+02 nc			Yes	FD
	71-43-2	BENZENE	0.7975	1.0846	ug/m3	OC-AA-FS-04-051104	7 / 12	0.233 - 1.4674	1.1E+00	NA	2.5E-02 ca			Yes	FD
	56-23-5	CARBON TETRACHLORIDE	0.4906	0.629	ug/m3	OC-AA-FS-03-091405	7 / 12	0.182 - 1.1322	6.3E-01	NA	1.3E-02 ca*			Yes	FD
	75-71-8	DICHLORODIFLUOROMETHANE	1.8315	3.3165	ug/m3	FS-12-051104,OC-AA-FS-24-	8 / 12	0.144 - 0.891	3.3E+00	NA	2.1E+01 nc			Yes	FD
	100-41-4	ETHYLBENZENE	0.434	0.9548	ug/m3	OC-AA-FS-04-051104	8 / 12	0.126 - 0.7812	9.5E-01	NA	1.1E+02 nc			Yes	FD
		M,P-XYLENES	1.302	3.1248	ug/m3	OC-AA-FS-04-051104	8 / 12	0.252 - 1.6058	3.1E+00	NA				Yes	FD
	75-09-2	METHYLENE CHLORIDE	2.082	2.082	ug/m3	OC-AA-FS-12-051104	1 / 12	1.006 - 6.246	2.1E+00	NA	4.1E-01 ca			Yes	FD
	95-47-6	O-XYLENE	0.434	1.1935	ug/m3	OC-AA-FS-04-051104	8 / 12	0.126 - 0.7812	1.2E+00	NA				Yes	FD
	127-18-4	TETRACHLOROETHENE	0.5424	1.8	ug/m3	OC-AA-FS-08-091405	7 / 12	0.197 - 1.2204	1.8E+00	NA	3.2E-02 ca			Yes	FD
	108-88-3	TOLUENE	3.6946	15.8	ug/m3	OC-AA-BIS-090806	9 / 12	0.109 - 0.6786	1.6E+01	NA	4.0E+01 nc			Yes	FD
	79-01-6	TRICHLOROETHENE	0.2255	1.1	ug/m3	OC-AA-FS-08-051104	5 / 12	0.156 - 0.9666	1.1E+00	NA	9.6E-02 ca			Yes	FD
	75-69-4	TRICHLOROFLUOROMETHANE (FREON 11)	1.5736	1.967	ug/m3	OC-AA-FS-08-091405	8 / 12	0.163 - 1.0116	2.0E+00	NA	7.3E+01 nc			Yes	FD

(1) Maximum detected concentration used for screening.
(2) Maximum detected background concentration.
(3) Screened against 1/10th EPA's Region 9 Preliminary Remediation Goals (PRGs) for ambient air (EPA 2004c) to account for additivity of multiple chemcials.
(4) Rationale Codes:

Selection Reason: ASL: Above Screening Level
TOX: Chemical is a Class A Carcinogen
DET: Relatively few chemicals detected at site, so comparison with screening levels and frequency of detection were not used to eliminate COPCs
NSL: No Screening Level
FD: Frequent Detection

Deletion Reason: BSL: Below Screening Level
BSL1: Infrequent Detection and Below Screening Level
NUT: Essential Nutrient
NTX: No Toxicity Information Available
IFD: Infrequent Detection

Definitions: NA: Not Available.
ND: Not Detected.
nc: Screening Toxicity Value is based on noncancer effects.
ca: Screening Toxicity Value is based on cancer effects.
COPC: Chemical of Potential Concern.
ARAR/TBC: Applicable or Relevant and Appropriate Requirement/To Be Considered
ug/m3: microgram per cubic meter.

Section 4
Exposure Assessment

Populations that may be exposed to contaminants at a site and pathways by which these populations may come into contact with site contaminants are identified in the exposure assessment. In addition, methods used to quantify potential exposures are presented. The goal of the exposure assessment is to estimate reasonable maximum exposure (RME) and central tendency exposure (CTE) for populations that may be exposed to chemicals at the site. RME typically falls within the 90th to 99.9th percentile of possible exposures (EPA, 1993b), and is designed to fall among the highest exposures that are reasonably expected to occur. Estimates for RME typically form the basis for remedial decisions. CTE is based on more typical human behavior patterns. Estimates of CTE are generally used to evaluate uncertainties and obtain insights into the range of exposures that may occur.

The reminder of this section discusses evaluation of RME and CTE for people that may use the site currently or in the future after redevelopment. This section is divided into several subsections, as follows:

- Exposure Assessment Process (Section 4.1)
- Site Setting (Section 4.2)
- Site Conceptual Exposure Model (SCEM) (Section 4.3)
- Exposure Parameter Assumptions (Section 4.4)
- Exposure Point Concentrations (Section 4.5)
- Chemical Intake Equations (Section 4.6)

4.1 Exposure Assessment Process

Exposure is defined as human contact with a chemical or physical agent (EPA, 1989). Exposure assessment is the estimation of magnitude, frequency, duration, and pathway(s) of exposure to a chemical. Assessment of exposure consists of three steps:

- Characterization of Exposure Setting
- Identification of Exposure Pathways
- Quantification of Exposure

The first step of the exposure assessment involves identifying physical characteristics of a site and the current and potential future use of the site by people. These characteristics, along with concentrations and distributions of COPCs, define the exposure setting for current and future human receptors.

Step two of the exposure assessment identifies pathways by which people might be exposed to site-related chemicals. Chemical sources, release and transport mechanisms, and inter-media transfer are evaluated. Exposure pathways are identified based on the location and activities of potentially exposed human receptors and on the types of potentially contaminated media.

The final step, exposure quantification, has two components: estimation of exposure point concentrations and calculation of chemical intake. Exposure point concentrations are chemical concentrations at the point of human contact with site media such as soil and soil gas. Site-specific chemical data from site investigations are used to estimate chemical exposure point concentrations. Summary statistics for available site data, exposure point concentrations, and equations for estimating these concentrations are presented in the HHRA.

Results of the exposure assessment are documented in RAGS Part D Tables A3-0 to A3-9.11, provided in Appendix A-3.

Chemical intake is the amount of chemical contacted per unit of body weight per unit of time, generally expressed as milligrams (mg) of chemical intake per kilogram (kg) body weight per day. Chemical intake is calculated by combining pathway-specific exposure assumptions, such as frequency and duration of exposure, with exposure point concentrations. Pathway-specific exposure assumptions are presented herein; chemical intake calculations are included in appendices to this document. Pathway-specific exposure assumptions used to calculate intake are based on site-specific data (when available) and USEPA and/or CalEPA default exposure assumptions.

4.2 Site Setting

Included in the characterization of the exposure setting is a description of physical characteristics of the site and identification of current and potential future human populations on and near the site as they pertain to potential human exposure.

As previously discussed, the Omega site is located in a commercial/industrial area in Whittier, California. From 1976 to 1991, Omega Chemical Corporation operated a treatment and disposal facility for commercial and industrial solid and liquid wastes and a transfer station for storage and consolidation of wastes for shipment to other treatment and/or disposal facilities. In 2003, Van Owen Holdings LLC of Los Angeles, California purchased the property. Currently, two buildings (an office building and a warehouse) are located at the relatively flat Site, with concrete paving covering exterior areas. Star City Auto Body occupies the warehouse (12504 Whittier Blvd.) and performs auto body repair and painting on the premises. The auto body shop also leases the small paved parking lot north of the warehouse building for automobile parking. The former administrative building (12512 Whittier Blvd.) and larger paved parking area south of the warehouse have had a variety of tenants since 2003. The former administration building is currently unoccupied, and the parking lot is used for temporary storage of wooden pallets by L&M Pallets on a month-to-month lease basis.

One commercial property (formerly Skateland) and two industrial properties (Medlin & Son and Terra Pave) are immediately adjacent to the Site (southeastern, northwestern, and southwestern boundaries, respectively). The northeastern boundary of the Site is bordered by Whittier Boulevard and a frontage road. The former Skateland facility, located at 12520 Whittier Boulevard, formerly had an indoor roller skating rink building that was demolished April 4, 2007. The Medlin & Son (former Cal-Air facility) facility, located at 12484 Whittier Boulevard, is operated as a machine shop (screw machines, lathes and mills, tapping and threading, saw cutting, welding, etc.).

The Terra Pave, Inc. facility, located at 12511 East Putnam Street, is utilized by a paving contractor. The property is utilized for temporary storage of asphalt paving materials for various job sites. Terra Pave also utilizes the property to park and maintain a variety of support vehicles and heavy-duty paving equipment. New England Lead Burning Company (NELCO), previously operated on the Terra Pave site in the mid-1950s. According to a Phase 1 Environmental Site Assessment (ESA) Report of the property prepared by Cardinal Environmental Consultants (Cardinal) on September 11, 1991, NELCO purchased lead in sheets, pipe and solid rods and fabricated the desired product by burning (welding) the lead to the required shape. NELCO subcontracted Vector Three Environmental Inc. of Brea, California, to clean the interior of all facilities and remove superficial lead from the topsoil. Remedial activities were monitored by Cardinal staff and confirmatory dust wipe and soil samples confirmed that remaining lead levels were very low. Environmental reports and sampling results were not available for review; therefore, lead levels prior to and after remediation and the depth of the soils removal are unknown.

Both current and future land use are evaluated in the selection of potential human receptors (EPA, 1991a). As described above, the Site is currently used for industrial purposes and will likely remain industrial or commercial in the future given the site surroundings of commercial/industrial use. The Site has never been used for residential purposes in the past, and given its zoning, it is unlikely that it will be used for residential purposes in the future. The City intends to allow redevelopment that consists of commercial and retail uses with the construction of multi-level buildings. Specifically, City representatives have stated that it is unlikely that the Omega property will be redeveloped for residential uses (Adams, 2007 – provided as Appendix C) However, a residential scenario is included in the analysis to provide additional information to the risk manager.

During an August 2006 groundwater sampling event, groundwater underlying the Site was measured at a depth of approximately 75 feet below ground surface. A clay unit exists starting at about 30 feet bgs, which likely represents a substantial barrier to upward migration of VOCs that volatilize at the capillary fringe of the water table. Currently, groundwater underlying the Site and in the immediate area is not used for domestic, industrial, or agricultural purposes. The nearest active downgradient water

supply wells are located more than one mile from the former Omega Chemical property. The closest active well (well 30R3) is located on Dice Road by Burke Street, approximately 1.25 miles downgradient of the former Omega Chemical property. This well is screened from 200 to 900 feet bgs and at least two aquitards appear to be present between the shallowest aquifer and the top of the well screen. Future use of groundwater for potable purposes is also unlikely due to high concentrations of TDS (Table 1-1). No evidence suggests that contamination extends to any potable aquifer that underlies the Gage unit.

4.3 Site Conceptual Exposure Model

The site conceptual exposure model model (SCEM) presented in this HHRA is consistent with the final On-site Soils Remedial Investigation/Feasibility Study Work Plan dated September 29, 2003 and describes the potential exposure pathways associated with the site, including potential sources of contamination, transport mechanisms, exposure routes, and potentially exposed populations. An exposure scenario consists of a potentially exposed population and one or more exposure pathways by which the receptor population may contact contaminants associated with a site. Only exposure pathways likely to be complete and to contribute significantly to overall exposure are evaluated quantitatively in the HHRA.

A complete exposure pathway consists of the following four elements:

- A source and mechanism of release of chemicals to the environment
- A transport medium for the released chemical
- An exposure point (the point of potential contact between receptor and medium)
- An exposure route (e.g., inhalation, ingestion)

If one or more of these elements are missing, the pathway is incomplete. Incomplete pathways are not quantitatively evaluated. Potentially complete pathways that are unlikely to contribute significantly to overall exposure are also not quantitatively evaluated. Therefore, an analysis of exposure pathways is included to identify those complete and significant exposure pathways that may be important for risk management decisions.

Sources of contamination, mechanisms of contaminant release from sources, and subsequent transport of contaminants through the environment are examined in this section to identify potentially contaminated media at the site. Potential exposure pathways for human receptors are discussed in subsequent sections.

The SCEM for the site, illustrated in Figure 4-1, highlights pathways that are assumed potentially complete and significant. Chemical migration from soil to groundwater and subsequent exposure of people to chemicals in groundwater is not addressed.

Complete exposure pathways shown in the SCEM (Figure 4-1) are summarized in Table 4-1.

4.3.1 Potentially Exposed Populations

The overall scope of the analysis is graphically illustrated in the SCEM for soils at the Omega Site (Figure 4-1). The SCEM includes theoretically feasible exposures and provides a basis for discussing the likelihood and importance of potential exposure pathways at the site. As illustrated in the SCEM, potentially exposed populations are assumed to be a future on-site resident, current and future on-site and off-site indoor industrial workers, future on-site outdoor industrial workers, and a future on-site construction worker.

4.3.1.1 Hypothetical Future Residents

Hypothetical future residents that were evaluated include an adult resident, a child resident (ages 1 to 6 year old), and an adult+child resident to represent a child that remains in the area from childhood through adulthood. Potentially complete exposure pathways for residents consist of incidental ingestion of surface and subsurface soil (to 10 feet bgs) following direct contact and subsequent hand-to-mouth activities and/or dermal absorption of contaminants from soil adhered to skin surface as well as inhalation of airborne particulates from surface soil. Exposure may also occur via inhalation of VOCs in soil gas that intrudes into indoor air and in ambient air. All of these potential exposures are quantitatively evaluated for hypothetical future residents.

If the site were redeveloped for residential development, some subsurface soils may be brought to the surface during grading activities. However, typical construction in the area is slab-on-grade resulting in minimal disturbance of deeper soils. The assumption that soils as deep as 12 feet bgs might be brought to the surface during site redevelopment is likely to overestimate the degree of soil disturbance likely if new buildings are erected at the site.

4.3.1.2 Commercial/Industrial Workers

Potentially complete exposure pathways for current commercial/industrial workers consist of incidental ingestion of surface soil (to 2.2 feet bgs) following contact and subsequent hand-to-mouth activities[1], incidental ingestion of dust tracked from surface into buildings, and inhalation of contaminants released from soil into air through wind or dust-generating activities (e.g., use of vehicles).
Commercial/industrial workers could also be exposed through dermal contact with soil and interior dust and inhalation of soil gas accumulating indoors and inhalation of ambient air. Dermal exposure pathways are not expected to contribute significantly to overall exposure; however, this pathway is quantitatively evaluated. Incidental

[1] Under current conditions, much of the site is paved or otherwise covered by buildings or concrete. As such, this ingestion pathway is only applicable if the site is redeveloped in the future to remove buildings or pavement, thereby exposing commercial/industrial workers to bare soil.

ingestion of surface soil and indoor dust and inhalation of soil gas in indoor air are also evaluated.

If the site were redeveloped in the future, some subsurface soils may be brought to the surface during grading activities. Although typical construction in the area is slab-on-grade resulting in minimal disturbance of deeper soils, future commercial/industrial workers were evaluated using deeper subsurface soils (to 12 feet bgs).

Because future development is unknown, a future outdoor industrial worker was evaluated to provide a range of potential exposures for the industrial worker. Future outdoor industrial workers were evaluated for the same exposure pathways as the indoor industrial worker with the exception of indoor air inhalation. Future outdoor industrial workers were assumed to spend all of their time outdoors.

4.3.1.3 Construction Workers

Potentially complete exposure pathways for construction workers consist of incidental ingestion of surface and subsurface soil following contact and subsequent hand-to-mouth activities, inhalation of fugitive dust through wind or dust-generating activities (e.g., use of vehicles, drilling, digging), and inhalation of contaminants released from soil gas into an excavation. Workers could also be exposed through dermal contact with soil and fugitive dust. All of these pathways are quantitatively addressed.

4.3.2 Potential Exposure Pathways

As discussed above, an exposure pathway generally consists of a chemical source, mechanism for release and transport, a point of exposure to the contaminated medium, and a route of exposure into the receptor. The absence of any one of these elements would result in an incomplete exposure pathway. Further, if one of these steps is very inefficient, exposure potential may be negligible, even though the pathway is theoretically complete. Potential exposure pathways are therefore identified in the SCEM and evaluated to determine whether they are complete and significant. The SCEM (Figure 4-1) identifies those complete pathways that may represent significant potential for exposure and are therefore the focus of the HHRA. As described above, receptors of concern include residents, commercial/industrial indoor and outdoor workers, and construction workers.

4.3.2.1 Ingestion and Dermal Contact with Groundwater

Currently, groundwater within the contaminant area (Gage unit) is not used for domestic, industrial, or agricultural purposes. Future use of groundwater for potable purposes is also unlikely due to high concentrations of TDS (Table 1-1). No evidence suggests that contamination extends to any potable aquifer that underlies the Gage unit. If future data collection indicates that downward vertical migration has occurred, then future risk evaluations will need to address a potential drinking water pathway. Potential on-site contaminant migration to groundwater is evaluated in the On-Site Soils Remedial Investigation Report. Risks associated with potential domestic

use of the contaminated groundwater plume will be evaluated in the EPA Site-wide Risk Assessment Report. Currently, this groundwater exposure pathway for ingestion is incomplete for all potential receptors.

Groundwater is 70 feet below ground surface and construction workers will not encounter groundwater in their excavations. Currently, this groundwater exposure pathway for dermal contact is also incomplete.

4.3.2.2 Incidental Ingestion and Dermal Contact with Contaminated Surface Soil and Inhalation of Particulates Released from Surface Soil

Soils at the site contain elevated levels of some chemicals as a result of past practices and activities. Currently, surface soils at the site, for the most part, are not exposed because the site is mostly covered with asphalt pavement, buildings, or other structures. Direct contact with contaminants in surface soils is likely minimal. However, for the purposes of the HHRA, the site is assumed to be uncovered (unpaved) and direct exposure to COPCs in surface soil could occur.

If areas with contaminated surface soils are left uncovered following theoretical future redevelopment, future on-site commercial/industrial workers and hypothetical future residents may contact surface soils. Potentially complete and significant pathways through which future on-site commercial/industrial workers and hypothetical future residents may contact surface soils consist of incidental ingestion, dermal contact, and inhalation of particulates released from surface soils into ambient air.

Furthermore, if the pavement and buildings at the site are removed during construction, contaminated soils may be uncovered. Future on-site construction workers may incidentally ingest and dermally contact contaminants in surface soils and may inhale particulates released from surface soils. Although these exposures are unlikely to be significant given the duration of construction activities, they will be evaluated to provide the risk manager with additional information.

4.3.2.3 Incidental Ingestion of Subsurface Soils, Dermal Contact with Subsurface Soils, and Inhalation of Particulates Released from Subsurface Soils

If the site is redeveloped in the future, future on-site construction workers, future industrial workers, and hypothetical future residents may contact contaminated subsurface soils. Construction workers may incidentally ingest and dermally contact contaminants in subsurface soils and may inhale particulates released from subsurface soils into ambient air. Hypothetical future residents and future industrial workers are assumed to be exposed to subsurface soils brought to the surface during site redevelopment and may inhale particulates released from subsurface soils.

4.3.2.4 Inhalation of Contaminants in Indoor Air

Contaminants released from contaminated soil into soil gas above the 30-foot clay may migrate below buildings and migrate indoors through foundation cracks. People

working or recreating indoors in these buildings may inhale contaminants in indoor air. Because dilution of air inside buildings occurs less rapidly than that in ambient air, some accumulation of contaminants is possible where high concentrations of VOCs are present in the subsurface below buildings. In addition, heating systems can, in theory, create a negative pressure that can enhance flow of soil gas into buildings. The indoor air pathway is theoretically complete for current and future commercial/industrial workers and hypothetical future residents. Quantitative risk estimates for current commercial/industrial workers are based on measured VOC concentrations in indoor air in buildings onsite and adjacent to the site. Indoor air data collected from the former Skateland building were considered to be irrelevant since this building was demolished on April 4, 2007.

Future commercial/industrial workers were quantitatively evaluated for indoor air exposure using measured soil gas results collected from 5 to 6 feet bgs for All Parcels. Hypothetical future residents were quantitatively evaluated using this same approach except using the soil gas results from the Site Parcel and the Other Parcels. The methodology for this evaluation is further described in Section 4.4.2.4. VOCs in groundwater could also volatilize to soil gas and migrate to indoor air. However, these vapors would exist below the 30-foot clay unit. Since this unit is expected to restrict vertical vapor flow, and vertical migration would probably be minimal. Also, any VOCs originating from groundwater would be reflected in shallow soil gas samples collected at the site, and any VOCs intruding into buildings would be reflected in indoor air samples collected within these buildings.

4.3.2.5 Inhalation of Indoor Air – Volatilization during Groundwater Use

As noted above, groundwater underlying the Site and in the immediate vicinity is currently not used for any purpose nor is it likely to be used for potable use in the future due to high concentrations of TDS (Table 1-1). This groundwater exposure pathway is currently incomplete. Potential on-site contaminant migration to groundwater is evaluated in the On-Site Soils Remedial Investigation Report. Risks associated with potential domestic use of the contaminated groundwater plume will be evaluated in the EPA Site-wide Risk Assessment Report.

4.3.2.6 Inhalation of Ambient Air

Volatile COPCs in the subsurface could migrate to the surface and be released to ambient air. Construction workers and on-site industrial workers who are outdoors could inhale these chemicals. Release of vapors does not require excavation or exposure of contaminated soils to air. Vapors may migrate through the vadose zone to the surface and be released as a consequence of barometric pumping and diffusion.

Ambient air exposures for commercial/industrial workers, however, are greatly reduced by barriers to vapor migration such as buildings or pavement that currently cover portions of the site, or could be placed on the site if redeveloped. Furthermore, because the atmosphere outside has no boundaries, any vapors that rise to surface and are released to ambient air will be quickly dispersed and concentrations would be low. Vapors migrating to indoor air are likely to present a more important exposure

pathway for commercial/industrial workers and hypothetical future residents because they will spend large amounts of time indoors, and because the building and foundation represent a "trap" for migrating gases. However, commercial/industrial workers and hypothetical future residents were evaluated for exposure to ambient air to provide information regarding the range of exposures.

Future excavation would not only remove this hardscape, but would also penetrate into the subsurface where the highest concentrations of VOCs in soil gas are observed. Release of VOCs to ambient air in an excavation is therefore also evaluated quantitatively for future construction workers.

Because measured ambient air concentrations are not likely to represent future ambient air concentrations, ambient air exposure was evaluated using measure soil gas concentrations modeled to provide ambient air concentrations. The methodology for this evaluation is further described in Section 4.4.2.4.

4.4 Exposure Parameter Assumptions

Exposure assumptions for the receptors and exposure pathways of concern are discussed below and presented in Table 4-2. A number of exposure assumptions apply to most or all exposure pathways and are discussed separately. The following sections provide pathway-specific and general exposure assumptions developed from site-specific and EPA default exposure information.

4.4.1 General Exposure Assumptions

4.4.1.1 Body Weight

In accordance with U.S. EPA guidance (1989), the value for body weight is the average weight of the receptor over the exposure period. For estimating exposures for adult residents, commercial/industrial workers and construction workers, a body weight of 70 kg is used as recommended by U.S. EPA (1989, 1991) and Cal EPA (1992, 2005c). A body weight of 15 kg is used for a child resident (CalEPA 1999).

4.4.1.2 Body Surface Area

An adult resident is assumed to wear a short-sleeved shirt, shorts and shoes, thereby exposing face, hands, forearms and lower legs. This results in a skin surface area available for contact of 5,700 cm^2/event (CalEPA, 2005c). A child resident is assumed to wear a short-sleeved shirt and shorts (no shoes), thereby exposing face, hands, forearms, lower legs, and feet. This results in a skin surface area available for contact of 2,900 cm^2/event (CalEPA, 2005d).

For commercial/industrial and construction workers, a total body surface area that is dermally exposed is assumed to be 3,300 cm^2/event (EPA, 2001; CalEPA, 2005c;). This surface area basically assumes that arms, hands and head will all be exposed at each event. Cooler weather or work that does not involve excavation, grading or other soil moving activities would likely result in lesser exposure. The dermal adherence factor or contact rate is assumed to be 0.8 mg/cm^2 for the construction worker(CalEPA,

2005e). The dermal adherence factor or contact rate for commercial/industrial workers is assumed to be 0.2 mg/cm^2 (CalEPA, 2005). These rates are estimates of soil adherence to skin and varies based on moisture content, part of the body, and type of activity.

4.4.1.3 Averaging Time

Averaging time is the period in days over which intake is averaged. For noncarcinogenic chemicals, intakes are averaged over the exposure duration (exposure duration [years] * 365 days/year). For carcinogens, intake calculations average the total cumulative dose over a lifetime (70 years * 365 days/year). Averaging times differ for carcinogens and noncarcinogens because the effects of carcinogenic chemicals are assumed to have no threshold. Therefore, any exposure to a carcinogen carries a finite risk of cancer during the individual's lifetime. Within reason, this means that a single large exposure to a carcinogen is expected to carry the same risk as the same dose divided into many small exposures. Therefore, carcinogen intakes are expressed in terms of lifetime exposures, regardless of the actual exposure duration (EPA, 1989).

4.4.1.4 Exposure Frequency

The exposure frequency is the number of days per year that an individual participates in a particular activity. For the residential scenario, the exposure frequency is 350 days per year. For the commercial/industrial indoor worker scenario, the exposure frequency is 250 days per year (EPA, 1989; CalEPA 2005c). For the commercial/industrial outdoor worker scenario, the exposure frequency is 225 days per year (EPA, 2002).

Given the relatively small size of the site (less than an acre), construction workers would not work in an excavation or with exposed soils for the entire duration of construction; therefore, the exposure frequency for CTE construction workers was assumed to be 60 days per year. This frequency is the equivalent to about 12 weeks or 3 months of construction time spent entirely within an excavation. However, to provide a range of potential exposure for the construction worker, the RME construction worker will be evaluated for an exposure frequency of 250 days.

4.4.1.5 Exposure Duration

Exposure duration is the number of years over which exposure may occur. For the residential scenario, the exposure duration is 30 years for an adult and 6 years for a child. For the adult+child scenario, the the exposure duration is 24 years as an adult and 6 years as a child. For the commercial/industrial worker, an exposure duration of 25 years is used (EPA, 1997; CalEPA, 2005c). For construction workers, an exposure duration of 1 year was assumed. This duration is a typical construction period for a building or home and is reasonable for the 1-acre lot size.

4.4.1.6 Exposure Time

Exposure time is the number of hours per day spent at the site. For adult and child residents, the exposure time is assumed to be 24 hours per day. For the commercial/industrial worker, an exposure time of 8 hours is used to represent the typical workday. Commercial/industrial indoor workers are assumed to spend an additional 1 hour outdoors inhaling ambient air. For the construction worker, an exposure time of 10 hours is used to represent the typical workday.

4.4.2 Pathway-Specific Exposure Assumptions

Several exposure parameters apply to specific exposure pathways and are described below.

4.4.2.1 Soil and Interior Dust Ingestion

A soil ingestion rate of 200 mg per day is used for the child resident. A soil ingestion rate of 100 mg per day is used for the adult resident and the RME commercial/industrial indoor worker scenario (CalEPA, 2005c). A CTE ingestion rate of 50 mg per day is used for the commercial/industrial indoor worker to address some potential variability in this factor (EPA 2002). Since commercial/industrial outdoor workers are likely to ingest more soil than indoor workers, a CTE ingestion rate of 100 mg per day (EPA 2002) and an RME ingestion rate of 150 mg per day is used for the commercial/industrial outdoor worker to provide a range of potential exposures.

There is no standard ingestion rate for construction workers. To address the potential variability in this factor, RME and CTE scenarios were developed. CTE and the RME soil ingestion rates of 100 and 330 mg per day, respectively, are used for the construction worker (EPA 1997; EPA 2002). The CTE ingestion rate of 100 mg per day is equivalent to the common default value used by both DTSC and EPA for an adult. The RME ingestion rate of 330 mg per day is the default ingestion rate used for a construction worker in the EPA soil screening level guidance (EPA 2002).

4.4.2.2 Inhalation of Fugitive Dust

The inhalation rate used for adult residents is 20 m^3 per day, which is equivalent to 0.83 m^3 per hour. The inhalation rate used for child residents is 10 m^3 per day, which is equivalent to 0.42 m^3 per hour (CalEPA, 2005d).

The inhalation rate used for adult commercial/industrial indoor workers under the RME scenario is 15.2 m^3 per work day, which is equivalent to 1.9 m^3 per hour over an 8-hour work day (EPA, 1997). This 1.9 m^3/hr represents the inhalation rate of an adult male involved in moderate activities, such as major indoor repairs and alteration and climbing stairs. It seems overly conservative to assume that all commercial/industrial workers would be engaged in such a high level of activity for the entire 8-hour work day. To address some potential variability in this factor, an inhalation rate of 1.2 m^3 per hour, which is equivalent to light activity for an adult male (EPA 1997) is used for the commercial/industrial indoor workers under the CTE scenario.

Since commercial/industrial outdoor workers are likely to be more active than indoor workers, the inhalation rate for a commercial/industrial outdoor worker under the CTE scenario is 15.2 m^3 per work day, which is equivalent to 1.9 m^3 per hour over an 8-hour work day (EPA, 1997). This 1.9 m^3/hr represents the inhalation rate of an adult male involved in moderate activities, such as major indoor repairs and alteration and climbing stairs. Under the RME scenario, an inhalation rate of 2.5 m^3 per hour is used to provide a range assuming more activity.

No standard inhalation rates are available for construction workers. To address the potential variability in this factor, RME and CTE scenarios were developed. The CTE and RME inhalation rates used for adult construction workers are 2.5 and 4.8 m^3 per hour, respectively (EPA, 1997). This 2.5 m^3 per hour estimate is based on the inhalation rate of an adult male involved in moderate activities, such as major indoor repairs and alterations and climbing stairs. The 4.8 m^3 per hour estimate is based on the inhalation rate of an adult male involved in heavy activities, such as vigorous physical exercise and climbing stairs while carrying a load. Activities listed are only examples of the level of effort for different inhalation rates. Outdoor construction workers would be engaged in other tasks, but the level of effort implied is still appropriate. Since it is unlikely that a construction worker will be engaged in these levels of activities for their entire 10-hour workday for every workday of the year, use of these inhalation estimates is assumed to be conservative.

4.4.2.3 Inhalation of Indoor Air

Inhalation of indoor air was evaluated for current commercial/industrial workers using measured indoor air concentrations to directly estimate risk related to indoor air exposure. For future commercial/industrial workers and for hypothetical on-site future residents, risk estimates were based on measured concentrations of VOCs in soil gas modeled to represent indoor air concentrations. The USEPA advanced soil gas spreadsheet implementation of (Windows™ - Excel) the Johnson and Ettinger vapor intrusion model (SG_ADV_Feb04.xls last modified February, 2004) was used to estimate potential indoor air concentrations from soil gas concentrations by calculating flux of chemicals through a foundation, taking into account building size and ventilation. Site-specific criteria entered into the model are as follows (and summarized in Table 4-3):

- Soil gas data from only the shallow depths sampled (5 to 6 feet bgs) were used because soil gas from the shallow portion of the vadose zone would be the most likely to migrate into onsite buildings. For the model soil gas sample depth was assumed to be 5 feet bgs.

- An average soil temperature of 67°F (19.4°C) was assumed per Figure A-1 in DTSC Indoor Air Guidance (Feb. 2005)

- Site soil was assumed to be loam soil, to be conservative and health-protective.

- For a commercial/industrial worker, the model was adjusted to account for an exposure frequency and duration of 250 days per year and 25 years, respectively, to represent a typical commercial worker. Standard default values of exposure time of 24 hours per day, exposure frequency of 350 days per year, and exposure duration of 30 years were used for the residential scenario.

- For a commercial/industrial worker, the model was adjusted to account for an exposure time of 18.24 hrs to adjust the model for the commercial/industrial worker inhalation rate of 15.2 m^3/d compared to the 20 m^3/day that the model assumes for residents.

- Toxicity criteria were updated using the online Office of Environmental Health Hazard Assessment (OEHHA) Toxicity Criteria Database[2] and the online USEPA Integrated Risk Information System (IRIS)[3] database.

- For a commercial worker, the exchange rate was changed to a value of 1.0 air exchanges per hour. This value is consistent with the minimal ventilation requirements per the 2001 Energy Efficiency Standards for Nonresidential Buildings.[4] This ventilation rate is appropriate for a new commercial/industrial facility building. Standard default value for the exchange rate (0.5 air exchanges per hour) was used for the residential scenario.

- The enclosed space height for the commercial worker was assumed to be 276 cm to represent a 9-foot ceiling, while 244 cm was used for residents to represent an 8-foot ceiling.

Other model input parameters include the physical/chemical properties of COPCs. Chemical properties (such as air and water diffusivities and Henry's law constants) were either found in the model, researched for inclusion in the model or calculated using the references provided in the user's guide for the Johnson and Ettinger Model (USEPA, 2004). Model defaults were used when site specific values were not available. Johnson and Ettinger calculations are provided in Appendix A-4.

The building concentration ($C_{building}$) reported on the INTERCALCs sheet of the J&E model was used as the indoor air concentration that the receptor is exposed to indoors and was used in the RAGS D Tables.

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[2] http://www.oehha.ca.gov/risk/ChemicalDB/index.asp
[3] http://www.epa.gov/iris/subst/index.html
[4] California Energy Commission 2001. Manual for Compliance with the 2001 Energy Efficiency Standards for Nonresidential Buildings, High-rise Residential Buildings, and Hotels/Motels). Document No P400-01-032. August.

4.4.2.4 Inhalation of Ambient Air

Ambient Air - Chronic Exposure Scenario

Karami, et al. (1987) along with the USEPA Draft Soil Screening Guidance (1994) were used to estimate ambient air concentrations for chronic exposure scenarios (residents and commercial workers). According to Karami, et al. (1987), assuming that the concentration at the surface is very small, vapor flux through soil can be estimated using the equation (see Table 4-4 for definitions of the variables in the following equations):

$$J = -D_s \times (-C_s)/L \qquad \text{(Eq. 1-1)}$$

Where

$$D_s = D_i \, (P_a^{10/3}/P_t^2) \qquad \text{(Eqn. 1-2)}$$

$$P_a = P_t - P_w \qquad \text{(Eqn. 1-3)}$$

The emission rate of the site can then be calculated by:

$$E = J \times A_{site} \qquad \text{(Eqn. 1-4)}$$

Assuming a simple box model, the ambient air concentration can then be calculated using the following equation:

$$C_{air} = E \, / \, (L_s \times W \times D_H) \qquad \text{(Eqn. 1-5)}$$

Proposed parameters (default and site-specific) for use in the equations are provided in Table 4-4. Calculations for ambient air from soil gas for the chronic scenarios are provided in Appendix A-6, Tables A6-1 through A6-6. The results are provided in the exposure concentration tables presented in Section 4.5.

Ambient Air - Short-term Exposure Scenario

For estimating ambient air concentrations for short-term exposure scenario (construction worker), measured soil gas concentrations were back calculated to estimate a soil source concentration. This soil concentration was then combined with a volatilization factor to calculate an ambient air concentration.

For the construction worker, it was assumed that contamination extended from the surface to the 30-foot clay layer, therefore, the 95 UCL for soil gas concentrations ranging from 5 to 30 feet deep for samples were used. To calculate a soil source concentration from this soil gas concentration the following equation was used (see Table 4-5 for definitions of the variables in the following equations):

$$C_r = C_{source} * (P_w + K_d * P_b + H' * P_a) \, / \, (H' * P_b) \qquad \text{Eqn. 2-1}$$

Proposed parameters (default and site-specific) for use in Equation 2-1 are provided in Table 4-5. Calculations for soil concentrations from soil gas for the chronic scenarios are provided in Appendix A-6, Tables A6-7 through A6-12.

To determine an ambient air concentration from this soil concentration, the soil concentration was input into the RBCA Tool Kit for Chemical Releases, Version 1.2 (1999). Proposed parameters (default and site-specific) for use in the RBCA Tool Kit model are provided in Table 4-6.

The ambient air concentration is then reported in box 3 of the RBCA Tool Kit results page. RBCA Tool Kit printouts are provided as Appendix A-7. The ambient air concentrations are provided in the exposure concentration tables presented in Section 4.5.

4.4.2.5 Exposure to Lead

Risks for lead were evaluated using EPA's Adult Lead Methodology for occupational exposures and the DTSC Leadspread model for residential exposures.

EPA Adult Lead Model

Risks for lead were evaluated using EPA's Adult Lead Methodology for occupational exposures and comparing to the threshold level of no more than 5 percent probability of blood lead levels exceeding 10 µg/dL. The EPA Adult Lead Methodology was used for occupational exposures instead of the DTSC Leadspread model because EPA Adult Lead Methodology includes a calculation for blood lead levels for an adult worker fetus.

Some key assumptions made in the EPA Adult Lead Methodology include:

- Exposure duration for commercial/industrial worker and the RME construction worker was revised to reflect 250 days per year.

- Exposure concentration for lead in soil was assumed to be 65.4 mg/kg (95% UCL for lead as shown in Table 4-7 for surface soil) for current commercial/industrial workers and 59.9 mg/kg (as shown in Table 4-8 for surface and subsurface soil to 12 feet bgs) for future commercial/industrial workers; and for the RME construction worker.

Default values were used for the remaining model parameters.

Lead calculations are presented in Appendix A-2A. Risks from lead exposure are not calculated for the CTE construction worker. A relatively constant lead intake over a minimum of 90 days, possibly more, is necessary to achieve a new quasi-steady state blood lead concentration and the exposure duration of the construction worker was estimated to be only 60 days. The Adult Lead Methodology is not capable of resolving such temporal effects. However, risks from lead exposure are calculated for the RME construction worker.

DTSC Leadspread Model

VOC transport from the subsurface to indoor air was modeled using the USEPA Lead concentrations in air and soil were evaluated using the most current available version of the Leadspread lead risk assessment spreadsheet (v. 7.0) provided by the DTSC (2000). The following assumptions were made for this model:

- Lead concentration in drinking water at the site was assumed to be equivalent to the California maximum contaminant level (MCL) (15 ug/L).
- Lead concentration in air was assumed to be 0.028 ug/m^3, the default average air concentration.
- Maximum lead concentration detected in the soil samples from this investigation was assumed to be the exposure concentration calculated for the lead in surface and subsurface soil from 0 to 12 feet bgs (59.9 mg/kg).
- Leadspread default values were used for the remaining model parameters.

Leadspread results for the hypothetical future residents are presented in Appendix A-2B.

4.5 Exposure Point Concentrations

Exposure point concentrations are estimated chemical concentrations a receptor will contact over an exposure period. Because of the uncertainty associated with any estimate of exposure, 95 percent upper confidence levels (UCLs) of the arithmetic mean are generally used as exposure point concentrations. Exposure point concentrations are calculated appropriately as 95 percent UCL of the arithmetic mean only when associated with an exposure unit within which exposures can reasonably be assumed to occur randomly. Exposure point concentrations are estimated using this approach for all COPCs for each exposure media identified for the site. EPA's statistical program *ProUCL*(EPA, 2001), were used to test data distributions and to compute UCLs of population means. For these calculations, non-detects were assumed to be equivalent to half of the detection limit. For datasets with less than 5 samples, the number of samples was too few to calculate a UCL and the maximum detected concentration was used as the exposure point concentration. Exposure point concentrations for all datasets assessed quantitatively are summarized in Tables 4-7 through 4-26. Exposure point concentrations for measured indoor air concentrations were not determined using UCL calculations due to the small number of samples and nature of indoor air concentrations. Instead, minimum and maximum detections within each building were used as the indoor air exposure point concentrations. These are provided on Tables 4-9 to 4-16. Measured ambient air values are provided in Table 4-17. Soil gas concentrations were modeled in the Johnson and Ettinger model to calculate indoor air exposure concentrations. The indoor air model results are provided in Tables 4-18 to 4-21. Johnson and Ettinger calculations are provided in Appendix A-4. Ambient air calculations are provided in Appendix A-6. These results are presented in Tables 4-22 to 4-26.

4.6 Chemical Intake

The amount of chemical that is taken into a person's body following exposure is referred to as chemical intake. Intake is expressed in units of milligrams of chemical per kilogram of body weight per day (mg/kg-day), and is referred to as chronic daily intake (CDI). CDI depends on the concentration of chemicals in media at the point of human contact (exposure point concentration), and exposure assumptions specific to the receptor population, including frequency and duration of exposure, body weight, and contact rate. EPA guidance indicates that exposure assumptions should be chosen so that their combination results in an estimate of the reasonable maximum exposure (RME) for the exposure pathway. RME is the highest exposure that is within the range of possible exposures at the site (EPA, 1989). RME is designed to be conservative yet designed to prevent unrealistic, or "worst case" estimates from serving as the basis of risk management decisions. A range of exposure estimates is provided by estimating the central tendency exposure (CTE) for each exposure pathway. CTE uses exposure assumptions that predict an average exposure to an individual. Presentation of both the RME and CTE risks for the site provides the risk manager with a range of potential risks.

CDI are calculated using exposure point concentrations for the media of concern and the exposure assumptions described in Section 3. CDIs are estimated for each selected exposure pathway. The equations used to calculate CDIs for each exposure pathway are shown below.

4.6.1 Ingestion of Soils and Interior Dust

To determine CDIs associated with incidental ingestion of chemicals in solid media (e.g., surface soils and interior dust), the following equation is used (EPA, 1989).

$$CDI\ (mg/kgday) = \frac{CS\ x\ IR\ x\ CF\ x\ FI\ x\ EF\ x\ ED\ x\ BAF}{BW\ x\ AT}$$

Where:

CDI = Chronic Daily Intake ((mg/kg)/day)

CS = Chemical Concentration in Soil or Dust (mg/kg)

IR = Ingestion Rate (mg/day)

CF = Conversion Factor (10^{-6} kg/mg)

FI = Fraction Ingested from Contaminated Source (unitless)

EF = Exposure Frequency (days/year)

ED = Exposure Duration (years)

BAF = Bioavailability Factor for COPC in Soil or Dust (unitless)

BW = Body Weight (kg)

AT = Averaging Time (days)

4.6.2 Dermal Contact with Soils and Interior Dust

To determine CDIs associated with dermal contact with chemicals in solid media (e.g., surface soils and interior dust), the following equation is used (EPA, 1989).

$$CDI\ (mg/kgday) = \frac{CS\ x\ SA\ x\ AF\ x\ ABS\ x\ CF\ x\ EF\ x\ ED}{BW\ x\ AT}$$

Where:

CDI = Chronic Daily Intake ((mg/kg)/day)

CS = Chemical Concentration in Soil or Dust (mg/kg)

SA = Skin surface area exposed (cm^2)

AF = Soil to skin adherence factor (mg/cm^2)

ABS = Absorption fraction of chemical from soil

CF = Conversion Factor (10^{-6} kg/mg)

EF = Exposure Frequency (days/year)

ED = Exposure Duration (years)

BW = Body Weight (kg)

AT = Averaging Time (days)

4.6.3 Inhalation of Fugitive Dust, Indoor Air, or Ambient Air

To determine CDIs associated with inhalation of COPCs in fugitive dust, indoor air or ambient air, the following equation is used (EPA, 1989).

$$CDI\ (mg/kgday) = \frac{CA\ x\ IhR\ x\ ET\ x\ EF\ x\ ED}{BW\ x\ AT}$$

Where:

CDI = Chronic Daily Intake ((mg/kg)/day)

CA = Chemical Concentration in Air (mg/m^3)

ET = Exposure Time (hours/day)

IhR = Inhalation Rate (m^3/hour)

EF = Exposure Frequency (days/year)

ED = Exposure Duration (years)

BW = Body Weight (kg)

AT = Averaging Time (days)

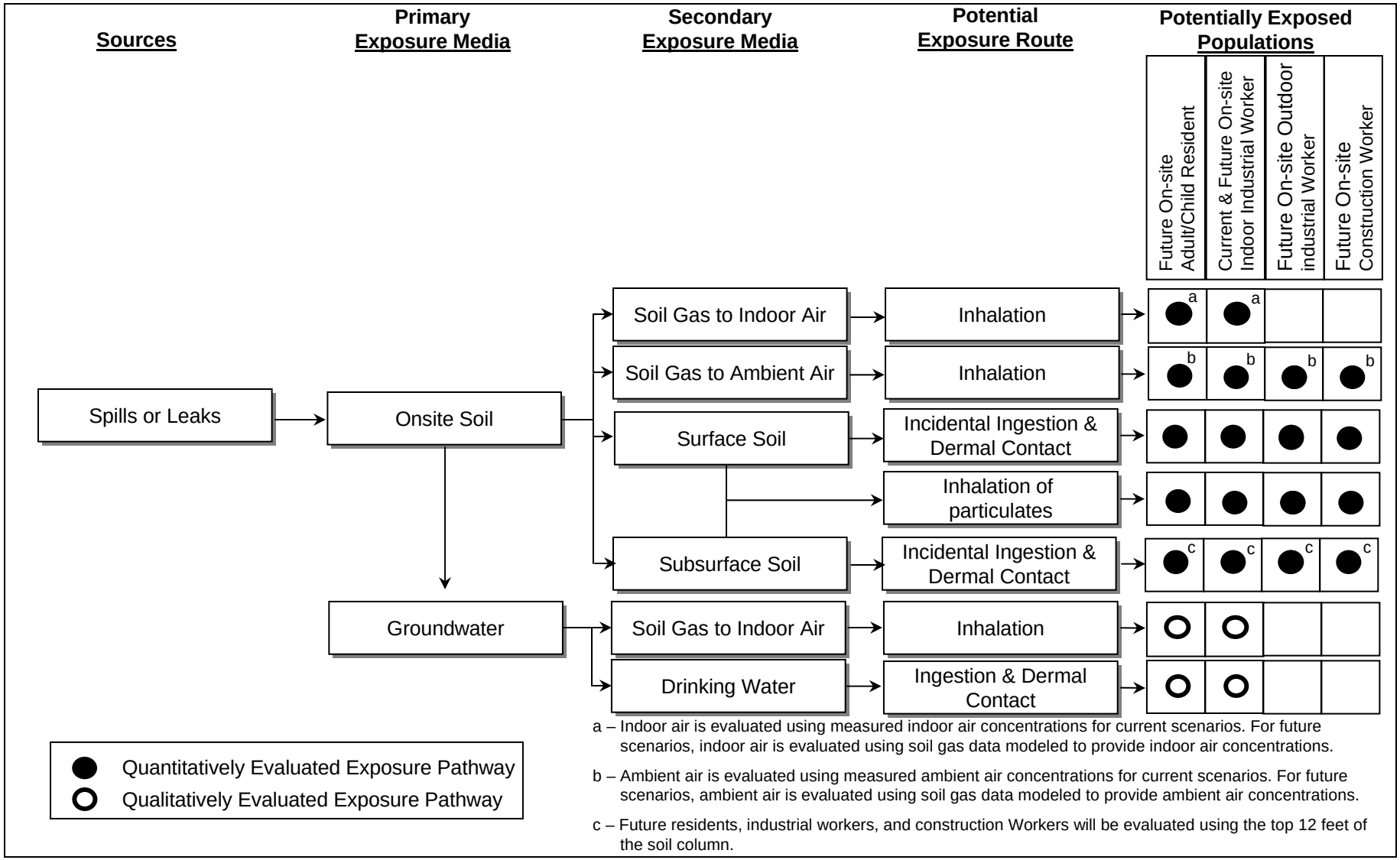


Figure 4-1
Site Conceptual Exposure Model – Omega Chemical Site
Whittier, California

CDM

Table 4-1
Summary of Receptors and Pathways of Concern

Exposure Pathway	Receptors of Concern				
	Future Industrial/ Commercial Workers		Current Industrial/ Commercial Workers	Future Construction Workers	Future Residents
	Indoor	Outdoor			
Indoor Air	Inhalation		Inhalation		Inhalation
Ambient Air	Inhalation	Inhalation	Inhalation	Inhalation[a]	Inhalation
Surface Soil – 0 to 2.2 feet bgs	Ingestion and Dermal Contact	Ingestion and Dermal Contact	Ingestion and Dermal Contact	Ingestion and Dermal Contact	Ingestion and Dermal Contact
Subsurface Soil – 2 to 12 feet bgs	Ingestion and Dermal Contact	Ingestion and Dermal Contact		Ingestion and Dermal Contact	Ingestion and Dermal Contact

[a] Ambient air and exposure to fugitive dust.

Table 4-2
Exposure Parameters

Exposure Parameter	Hypothetical Future Resident	Current and Future Industrial/Commercial Workers		Future Construction Worker
		Indoor	Outdoor	
Body Weight (kg)	Adult = 70 [a,d] Child = 15	70 [a,d]	70 [a,d]	70 [a,d]
Averaging Time - Carcinogenic (days)	25,500 [a,d]	25,550 [a,d]	25,550 [a, d]	25,550 [a,d]
Averaging Time - Noncarcinogenic (days)	Adult = 10,950 [a,d] Child = 2,190	9,125 [a,d]	9,125 [a, d]	365 [a]
Exposure Frequency (days/yr)	350 [d]	250 [d]	225 [g]	RME = 250 [b] CTE = 60
Exposure Duration (years)	Adult = 30 [e] Child = 6	25 [d]	25 [g]	1 [b]
Exposure Time (hrs/day)	24 [a,d]	8 [e]	8 [e]	10 [b]
Soil Ingestion Rate (mg/day)	Adult = 100 [e] Child = 200	RME = 100 [b, g] CTE = 50	RME = 150 [b, g] CTE = 100	RME = 330 [c,g] CTE = 100
Air Inhalation Rate (m^3/hr)	Adult = 0.83 [e] Child = 0.42	RME = 1.9 [b, d] CTE = 1.2	RME = 2.5 [b, d] CTE = 1.9	RME = 4.8 [b,c] CTE = 2.5
Skin Surface Area Available for Contact (cm^2/event)	Adult = 5,700 [e] Child = 2,900	3,300 [d]	3,300 [g]	3,300 [d]
Contact Rate (mg/cm^2)	Adult = 0.07 [f] Child = 0.2	0.2 [d]	0.2 [g]	0.8 [h]

RME – reasonable maximum exposure
CTE – central tendency exposure
NA – not applicable
Sources: a – USEPA, 1989a. Risk Assessment Guidance for Superfund. Volume I - Human Health Evaluation Manual, Part A. EPA/540/1-89/002. Office of Emergency and Remedial Response. Washington D.C.
b – Site-specific. Professional judgment. See text.
c – USEPA, 1997. Exposure Factors Handbook. EPA/600/P-95/002Fa
d – CalEPA, 2005, Human Exposure Based Screening Numbers Developed to Aid Estimation of Cleanup Costs for Contaminated Soil. Appendix C. January revision.
e – CalEPA/DTSC, 2005, Recommended DTSC Default Exposure Factors for Use in Risk Assessment at California Military Facilities. October 25.
f – EPA, 2004a: Risk Assessment Guidance for Superfund. Vol. 1: Human Health Evaluation Manual, Part E, Supplemental Guidance for Dermal Risk Assessment. EPA/540/R/99/005.
g – EPA, 2002, Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites. OSWER 9355.4-24.
h - CalEPA/DTSC, 2005e: DTSC/HERD Human Health Risk Assessment (HHRA) Note Number 1. October.

Table 4-3
Johnson and Ettinger Model Input Parameters for Site-Specific Screening

Variable	Description	Default Value	Proposed Site-Specific Value	Source
C_{sg}	Soil gas concentrations	Site-specific	Chemical-specific	95 UCL for soil gas concentrations ranging from 5 to 6 feet deep for samples collected on the Omega site parcel
θ_t	Soil total porosity	Site-specific	0.399	Model default for Loam soil
θ_w	Soil water-filled porosity	Site-specific	0.148	Model default for Loam soil
θ_a	Soil air-filled porosity	Site-specific	0.251	Model default for Loam soil
ρ_s	Soil dry bulk density	Site-specific	1.59	Model default for Loam soil
k	Soil intrinsic permeability	Site-specific	2.29E-09	Model default for Loam soil
° T	Soil and groundwater temperature	Site-specific	67°F (19.4°C)	Figure A-1 from DTSC 2005
ΔP	Indoor – outdoor pressure differential	40 g/cm-s^2	Default	USEPA 2004
η	Crack-to-total area ratio	0.005	0.0004	Calculated based on recommended 0.1 cm crack width (USEPA 2003). (1)
E_b	Indoor air exchange rate - residential	0.5 / hour	Default	USEPA 1997
	Indoor air exchange rate - commercial	1.0 / hour	Default	CEC 2001
L_{crack}	Foundation slab thickness	Site-specific	15 cm	
L_b,W_b	Building dimensions – length x width	1000 cm x 1000 cm	Default	DTSC 2005
H_b	Building dimension – height - residential	244 cm (8 ft)	Default	DTSC 2005
	Building dimension – height - commercial	none	276 cm (9 ft)	
L_f	Foundation depth below grade – building with no basement	15 cm	Default	USEPA 2004
L_s	Soil gas sampling depth below grade	Site-specific	152.4 cm (5 ft)	Site data
ED, EF, ET	Exposure Duration, Exposure Frequency, Exposure Time – residential	30 years, 350 days/yr, 24 hrs/day	Default	USEPA 1997
ED, EF, ET	Exposure Duration, Exposure Frequency, Exposure Time - commercial	none	25 years, 250 days/yr, 18.24 hrs/day (2)	USEPA 1997

USEPA = United States Environmental Protection Agency
DTSC = Department of Toxic Substances Control
CEC = California Energy Commission
cm = centimeters
ft = feet
g/cm-s^2 = grams per centimeter – seconds squared

(1) For future buildings, a soil gas advection rate of 5 liters per minute should be used, as proportionally increased for future building size, rather than the defaults for indoor – outdoor pressure differential, crack-to-total area ratio, and foundation thickness.

(2) Exposure time of18.24 hrs to adjust the model for the commercial/industrial worker inhalation rate of 15.2 m^3/d compared to the 20 m^3/day that the model assumes for residents.

Table 4-4
Input Parameters for Estimating Ambient Air Concentrations for Chronic Exposure Scenarios (Residents and Commercial Workers)

Variable	Description	Default Value	Proposed Site-Specific Value	Source
L	Depth of the soil layer	Site-specific	1.524 m (5 ft)	Site data
D_i	Vapor diffusion coefficient in air	Chemical-specific	Chemical-specific	J&E model value for PCE (USEPA 2004)
P_t	Total porosity	Site-specific	0.399 m^3/m^3	J&E model value for loam (USEPA 2004)
P_w	Water-filled porosity	Site-specific	0.148 m^3/m^3	J&E model value for loam (USEPA 2004)
P_a	Air-filled porosity	Site-specific	0.251 m^3/m^3	Calculated from USEPA 2002 Eqn 1-3
C_s	Concentration in the air at depth	Site-specific	Chemical-specific	95 UCL for soil gas concentrations ranging from 5 to 6 feet deep
A_{site}	Site area	0.5 acres	1 acre (4046.873 m^2)	Site specific
D_s	Apparent steady state vapor diffusion coefficient	Site-specific	Chemical-specific	Calculated from Millington and Quirk (1961) Eqn 1-2
J	Vapor flux through soil	Site-specific	Chemical-specific	Calculated from Eqn. 1-1
E	Emission rate	Site-specific	Chemical-specific	Calculated from Eqn. 1-4
L_s	Length of side	Site-specific	63.6 m^2	Site–specific - Square root of 1 acre site
V	Average wind speed	Site-specific	1.65 m	Average annual wind speed in Whittier (1)
D_H	Diffusion Height	Site-specific	2 m	Breathing zone
C_{air}	Concentration in Ambient Air	Site-specific	Chemical-specific	Calculated from Eqn. 1-5

m^3/m^3 = cubic meter per cubic meter
$kg/m^2/s$ = = kilograms per square meter per second
ft = feet
m = meter
m^2 = square meters
USEPA = United States Environmental Protection Agency
(1) http://www.whittier-weather.com/)

Table 4-5
Input Parameters for Estimating Soil Concentrations from Soil Gas Concentrations for Sub-chronic Exposure (Construction Worker)

Variable	Description	Default Value	Proposed Site-Specific Value	Source
C_{source}	vapor concentration at soil source	Site-specific	Chemical-specific	95 UCL for soil gas concentrations ranging from 5 to 30 feet deep
P_b	bulk dry soil density	Site-specific	1.59 g/cm^3	J&E model value for loam (USEPA 2004)
P_t	Total porosity	Site-specific	0.399 m^3/m^3	J&E model value for loam (USEPA 2004)
P_a	Air-filled porosity	Site-specific	0.251 m^3/m^3	Calculated from USEPA 2002 Eqn 1-3
P_w	Water-filled porosity	Site-specific	0.148 m^3/m^3	J&E model value for loam (USEPA 2004)
K_d	Soil-water partition coefficient	Chemical-specific	Default	Calculated from K_{oc} x f_{oc}
K_{oc}	Organic carbon partition coefficient (g/cm^3)	Chemical-specific	Default	J&E model value (USEPA 2004)
f_{oc}	Fraction of organic carbon for loam (unitless)	0.002 for loam	Default	
H'	Henry's law constant (unitless)	Chemical-specific	Chemical-specific	J&E model value (USEPA 2004)
C_r	soil concentration (g/g)	Site-specific	Chemical-specific	Calculated from Eqn 2-1

m^3/m^3 = cubic meter per cubic meter
g/cm^3 = = grams per cubic centimeter
USEPA = United States Environmental Protection Agency

Table 4-6
Input Parameters for RBCA Tool Kit Model

Description	Default Value	Proposed Site-Specific Value	Source
Soil concentration	Site-specific	Chemical-specific	Calculated from 95 UCL for soil gas concentrations ranging from 5 to 30 feet deep
Depth to top of affected soils	Site-specific	152.4 cm (5 ft)	Site data
Depth to base of affected soils	Site-specific	914.4 cm (30 ft)	Site data
Affected soil area	Site-specific	40,500,000 cm^2 (1 acre)	Site data
Length of affected soil parallel to assumed wind direction	Site-specific	6,361 cm	Site data
bulk dry soil density	Site-specific	1.59 g/cm^3	J&E model value for loam (USEPA 2004)
Total porosity	Site-specific	0.399 m^3/m^3	J&E model value for loam (USEPA 2004)
Volumetric Air Content – Vadose Zone	Site-specific	0.251 m^3/m^3	Calculated from total porosity – volumetric water content
Volumetric Water Content – Vadose Zone	Site-specific	0.148 m^3/m^3	J&E model value for loam (USEPA 2004)
Volumetric Air Content – Capillary Fringe	Site-specific	0.067 m^3/m^3	Calculated from total porosity – volumetric water content
Volumetric Water Content – Capillary Fringe	Site-specific	0.332 m^3/m^3	J&E guidance value for loam (USEPA 2004)
Vertical hydraulic conductivity	Site-specific	12 cm/d	J&E guidance value for loam (USEPA 2004)
Vapor permeability	Site-specific	1.6E-9 cm^2	J&E guidance value for loam (USEPA 2004)
Capillary zone thickness	Site-specific	37.5 cm	J&E guidance value for loam (USEPA 2004)
Fraction of organic carbon for loam (unitless)	Site-specific	0.002	
Air mixing zone height	200 cm	Default	Breathing zone height
Ambient air velocity in mixing zone	Site-specific	33 cm/s	$1/5^{th}$ the value of the site average air velocity of 1.65 m/s to account for being in an excavation

mg/kg = milligram per kilogram
cm = centimeter
ft = feet
cm^2 = square centimeter
g/cm^3 = = grams per cubic centimeter
m^3/m^3 = cubic meter per cubic meter
cm/d = centimeters per day
cm/s = centimeters per second
USEPA = United States Environmental Protection Agency

TABLE 4-7 - Parcel Site

MEDIUM-SPECIFIC EXPOSURE POINT CONCENTRATION SUMMARY - Surface Soil 0 to 2.2 ft bgs

Omega Chemical Site - Whittier, California

Scenario Timeframe:	Current
Medium:	Surface Soil 0' to 2.2'
Exposure Medium:	Surface Soil 0' to 2.2'

Exposure Point	Chemical of Potential Concern	Units	Arithmetic Mean [1]	95% UCL of Distribution [1]	Maximum Detected Concentration	Exposure Point Concentrations			
						Value	Units	Statistic [2]	Rationale
Surface Soil									
	1,2-DICHLOROBENZENE	mg/kg	0.13	0.45	0.24	0.24	mg/kg	Max	UCL is greater than Max
	1,4-DIOXANE	mg/kg	1.73	9.62	14	9.62	mg/kg	95% UCL-T	
	2-METHYLNAPHTHALENE	mg/kg	0.19	0.39	0.54	0.39	mg/kg	UCL-NP	
	4,4'-DDD	mg/kg	0.00	0.02	0.032	0.02	mg/kg	UCL-NP	
	4,4'-DDE	mg/kg	0.02	0.17	0.3	0.17	mg/kg	UCL-NP	
	4,4'-DDT	mg/kg	0.02	0.11	0.15	0.11	mg/kg	UCL-NP	
	ALUMINUM	mg/kg	9,707.50	No UCL	9830	9830.00	mg/kg	Max	UCL is greater than Max
	ANTIMONY	mg/kg	4.39	13.71	18	13.71	mg/kg	UCL-NP	
	BARIUM	mg/kg	150.54	161.51	230	161.51	mg/kg	UCL-NP	
	BENZO(A)ANTHRACENE	mg/kg	0.29	1.93	2.4	1.93	mg/kg	UCL-NP	
	BENZO(A)PYRENE	mg/kg	0.25	0.76	1.6	0.76	mg/kg	UCL-NP	
	BENZO(B)FLUORANTHENE	mg/kg	0.19	0.49	0.91	0.49	mg/kg	UCL-NP	
	BERYLLIUM	mg/kg	0.48	0.51	0.75	0.51	mg/kg	UCL-NP	
	BIS(2-ETHYLHEXYL)PHTHALATE	mg/kg	3.26	27.15	51	27.15	mg/kg	UCL-NP	
	BUTYLBENZYL PHTHALATE	mg/kg	0.31	0.90	1.9	0.90	mg/kg	UCL-NP	
	CADMIUM	mg/kg	0.88	1.34	2.1	1.34	mg/kg	UCL-NP	
	CHROMIUM III	mg/kg	34.23	76.09	308.5714286	76.09	mg/kg	UCL-NP	
	CHROMIUM VI	mg/kg	5.70	12.68	51.42857143	12.68	mg/kg	UCL-NP	
	CHRYSENE	mg/kg	0.55	4.73	6	4.73	mg/kg	UCL-NP	
	COBALT	mg/kg	8.95	9.51	16	9.51	mg/kg	UCL-NP	
	COPPER	mg/kg	32.65	40.02	150	40.02	mg/kg	UCL-NP	
	DIELDRIN	mg/kg	0.00	0.04	0.05	0.04	mg/kg	UCL-NP	
	FLUORANTHENE (IDRYL)	mg/kg	0.16	0.37	0.66	0.37	mg/kg	UCL-NP	
	IRON	mg/kg	22,650.00	No UCL	23300	23300.00	mg/kg	Max	UCL is greater than Max
	ISOPHORONE	mg/kg	0.95	9.05	9.9	9.05	mg/kg	UCL-NP	
	LEAD	mg/kg	55.72	65.38	890	65.38	mg/kg	95% UCL-T	
	MANGANESE	mg/kg	296.00	No UCL	353	353.00	mg/kg	Max	UCL is greater than Max
	MERCURY	mg/kg	0.15	0.30	0.85	0.30	mg/kg	UCL-NP	
	MOLYBDENUM	mg/kg	2.93	3.38	4.2	3.38	mg/kg	95% UCL-N	
	NAPHTHALENE	mg/kg	0.22	0.60	1.2	0.60	mg/kg	UCL-NP	
	NICKEL	mg/kg	22.51	24.93	55	24.93	mg/kg	% UCL-G assur	
	PCB-1254 (AROCLOR 1254)	mg/kg	0.06	0.43	0.5	0.43	mg/kg	UCL-NP	
	PHENANTHRENE	mg/kg	0.44	3.69	5	3.69	mg/kg	UCL-NP	
	POLYCHLORINATED BI PHENYLS, TOTAL	mg/kg	0.50	No UCL	0.5	0.50	mg/kg	Max	UCL is greater than Max
	PYRENE	mg/kg	0.32	2.31	3.1	2.31	mg/kg	UCL-NP	
	SILVER	mg/kg	0.56	0.65	1.2	0.65	mg/kg	UCL-NP	

TABLE 4-7 - Parcel Site

MEDIUM-SPECIFIC EXPOSURE POINT CONCENTRATION SUMMARY - Surface Soil 0 to 2.2 ft bgs

Omega Chemical Site - Whittier, California

Scenario Timeframe:	Current
Medium:	Surface Soil 0' to 2.2'
Exposure Medium:	Surface Soil 0' to 2.2'

Exposure Point	Chemical of Potential Concern	Units	Arithmetic Mean [1]	95% UCL of Distribution [1]	Maximum Detected Concentration	Exposure Point Concentrations			
						Value	Units	Statistic [2]	Rationale
	THALLIUM	mg/kg	2.42	3.34	2	2.00	mg/kg	Max	UCL is greater than Max
	VANADIUM	mg/kg	44.10	47.09	71	47.09	mg/kg	95% UCL-N	
	ZINC	mg/kg	81.53	97.28	350	97.28	mg/kg	UCL-NP	

Statistics: Maximum Detected Value (Max); 95% UCL of Normal Data (95% UCL-N); 95% UCL of Log-transformed Data (95% UCL-T); Non-parametric (UCL-NP); 95% UCL assuming Gamma distribution (95% G-UCL).

(1) The arithmetic mean and the 95UCL were calculated including half the detection limit for the non-detects. As a result, in some cases these values are above the maximum detected.

(2) The Shapiro-Wilk test was used to test the normality/ lognormality of all data sets at the 0.05 significance level. The UCL procedures listed were selected based on the recommendations of the ProUCL statistical program and based on the results of the W Test, the number of samples, and the standard deviation of the log-transformed data.

NA: too few detections to calculate a UCL

mg/kg: milligram per kilogram.

TABLE 4-8- Parcel Site

MEDIUM-SPECIFIC EXPOSURE POINT CONCENTRATION SUMMARY - Surface and Subsurface Soil 0 to 12 ft bgs

Omega Chemical Site - Whittier, California

Scenario Timeframe:	Future
Medium:	Surface & Subsurface Soil to 12'
Exposure Medium:	Surface & Subsurface Soil to 12'

Exposure Point	Chemical of Potential Concern	Units	Arithmetic Mean [1]	95% UCL of Distribution [1]	Maximum Detected Concentration	Exposure Point Concentrations			
						Value	Units	Statistic [2]	Rationale
Surface/Subsurface									
	1,1,1-TRICHLOROETHANE	mg/kg	58.19	456.46	0.047	0.047	mg/kg	Max	UCL is greater than Max
	1,1,2-TRICHLOROETHANE	mg/kg	2.68	14.44	0.0034	0.0034	mg/kg	Max	UCL is greater than Max
	1,1-DICHLOROETHANE	mg/kg	2.68	14.44	0.0084	0.0084	mg/kg	Max	UCL is greater than Max
	1,1-DICHLOROETHENE	mg/kg	3.53	21.58	0.0039	0.0039	mg/kg	Max	UCL is greater than Max
	1,2-DICHLOROBENZENE	mg/kg	0.76	7.11	0.24	0.24	mg/kg	Max	UCL is greater than Max
	1,2-DICHLOROETHANE	mg/kg	2.73	14.47	0.0063	0.0063	mg/kg	Max	UCL is greater than Max
	1,4-DIOXANE	mg/kg	4.27	43.42	28	28	mg/kg	Max	UCL is greater than Max
	2-METHYLNAPHTHALENE	mg/kg	0.20	0.37	0.54	0.37	mg/kg	UCL-NP	
	4,4'-DDE	mg/kg	0.01	0.14	0.3	0.14	mg/kg	UCL-NP	
	4,4'-DDT	mg/kg	0.01	0.09	0.15	0.09	mg/kg	UCL-NP	
	ALUMINUM	mg/kg	9,707.50	No UCL	9830	9830	mg/kg	Max	UCL is greater than Max
	ANTIMONY	mg/kg	4.48	12.30	18	12.30	mg/kg	UCL-NP	
	BARIUM	mg/kg	146.44	157.66	230	157.66	mg/kg	UCL-NP	
	BENZO(A)ANTHRACENE	mg/kg	0.27	0.84	2.4	0.84	mg/kg	UCL-NP	
	BENZO(A)PYRENE	mg/kg	0.24	0.64	1.6	0.64	mg/kg	UCL-NP	
	BENZO(B)FLUORANTHENE	mg/kg	0.20	0.44	0.91	0.44	mg/kg	UCL-NP	
	BENZYL ALCOHOL (PHENYLMETHANOL)	mg/kg	1.89	15.58	22	15.58	mg/kg	UCL-NP	
	BERYLLIUM	mg/kg	0.48	0.51	0.75	0.51	mg/kg	UCL-NP	
	BIS(2-ETHYLHEXYL)PHTHALATE	mg/kg	3.07	23.13	51	23.13	mg/kg	UCL-NP	
	BUTYLBENZYL PHTHALATE	mg/kg	0.29	0.76	1.9	0.76	mg/kg	UCL-NP	
	CADMIUM	mg/kg	0.82	1.25	2.1	1.25	mg/kg	UCL-NP	
	CHLOROFORM	mg/kg	2.68	14.44	0.0047	0.0047	mg/kg	Max	UCL is greater than Max
	CHROMIUM III	mg/kg	32.87	70.82	308.57	70.82	mg/kg	UCL-NP	
	CHROMIUM VI	mg/kg	5.48	11.80	51.43	11.80	mg/kg	UCL-NP	
	CHRYSENE	mg/kg	0.47	3.72	6	3.72	mg/kg	UCL-NP	
	COBALT	mg/kg	8.72	9.31	16	9.31	mg/kg	UCL-NP	
	COPPER	mg/kg	33.74	40.47	150	40.47	mg/kg	UCL-NP	
	DIELDRIN	mg/kg	0.00	0.03	0.05	0.03	mg/kg	UCL-NP	
	FLUORANTHENE (IDRYL)	mg/kg	0.18	0.36	0.66	0.36	mg/kg	UCL-NP	
	IRON	mg/kg	22,650.00	No UCL	23300	23300	mg/kg	Max	UCL is greater than Max
	ISOPHORONE	mg/kg	1.15	8.17	9.9	8.17	mg/kg	UCL-NP	
	LEAD	mg/kg	51.02	59.89	890	59.89	mg/kg	95% UCL-T	
	MANGANESE	mg/kg	296.00	No UCL	353	353	mg/kg	Max	UCL is greater than Max
	MERCURY	mg/kg	0.14	0.28	0.85	0.28	mg/kg	UCL-NP	
	MOLYBDENUM	mg/kg	2.84	3.91	4.2	3.91	mg/kg	UCL-NP	
	NAPHTHALENE	mg/kg	0.19	0.79	1.2	0.79	mg/kg	UCL-NP	

TABLE 4-8- Parcel Site

MEDIUM-SPECIFIC EXPOSURE POINT CONCENTRATION SUMMARY - Surface and Subsurface Soil 0 to 12 ft bgs

Omega Chemical Site - Whittier, California

Scenario Timeframe:	Future
Medium:	Surface & Subsurface Soil to 12'
Exposure Medium:	Surface & Subsurface Soil to 12'

Exposure Point	Chemical of Potential Concern	Units	Arithmetic Mean [1]	95% UCL of Distribution [1]	Maximum Detected Concentration	Exposure Point Concentrations			
						Value	Units	Statistic [2]	Rationale
	NICKEL	mg/kg	22.28	24.51	55	24.51	mg/kg	UCL-NP	
	PCB-1254 (AROCLOR 1254)	mg/kg	0.06	0.34	0.5	0.34	mg/kg	UCL-NP	
	PHENANTHRENE	mg/kg	0.40	2.96	5	2.96	mg/kg	UCL-NP	
	POLYCHLORINATED BI PHENYLS, TOTAL	mg/kg	0.50	No UCL	0.5	0.5	mg/kg	Max	UCL is greater than Max
	PYRENE	mg/kg	0.30	1.88	3.1	1.88	mg/kg	UCL-NP	
	SILVER	mg/kg	0.54	0.61	1.2	0.61	mg/kg	UCL-NP	
	TETRACHLOROETHENE	mg/kg	85.68	922.68	4.3	4.3	mg/kg	Max	UCL is greater than Max
	THALLIUM	mg/kg	2.56	3.41	2	2	mg/kg	Max	UCL is greater than Max
	TRICHLOROETHENE	mg/kg	7.56	51.89	0.028	0.028	mg/kg	Max	UCL is greater than Max
	VANADIUM	mg/kg	43.89	46.95	71	46.95	mg/kg	95% UCL-N	
	ZINC	mg/kg	80.23	94.57	350	94.57	mg/kg	UCL-NP	

Statistics: Maximum Detected Value (Max); 95% UCL of Normal Data (95% UCL-N); 95% UCL of Log-transformed Data (95% UCL-T); Non-parametric (UCL-NP); 95% UCL assuming Gamma distribution (95% G-UCL).

(1) The arithmetic mean and the 95UCL were calculated including half the detection limit for the non-detects. As a result, in some cases these values are above the maximum detected.

(2) The Shapiro-Wilk test was used to test the normality/ lognormality of all data sets at the 0.05 significance level. The UCL procedures listed were selected based on the recommendations of the ProUCL statistical program and based on the results of the W Test, the number of samples, and the standard deviation of the log-transformed data.

NA: too few detections to calculate a UCL

mg/kg: milligram per kilogram.

TABLE 4-9 - Parcel Site - 3 Kings Construction - Indoor Air
MEDIUM-SPECIFIC EXPOSURE POINT CONCENTRATION SUMMARY
Omega Chemical Site - Whittier, California

Scenario Timeframe:	Current
Medium:	Indoor Air
Exposure Medium:	Indoor Air

Exposure Point	Chemical of Potential Concern	Units	Arithmetic Mean [1]	95% UCL of Distribution [1]	Maximum Detected Concentration	Exposure Point Concentrations					
						Minimum Detected Value	Units	Maximum EPC Value	Units	Statistic [2]	Rationale
Indoor Air											
	1,1,1-TRICHLOROETHANE	ug/m3	0.20	No UCL	0.2	0.2	ug/m^3	0.2	ug/m^3	Max	Too Few Samples for UCL
	1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE	ug/m3	4.18	No UCL	6.8	1.6	ug/m^3	6.8	ug/m^3	Max	Too Few Samples for UCL
	1,1-DICHLOROETHENE	ug/m3	4.38	No UCL	9	0.7	ug/m^3	9.2	ug/m^3	Max	Too Few Samples for UCL
	ACETONE	ug/m3	34.75	No UCL	50.00	24.0	ug/m^3	50.0	ug/m^3	Max	Too Few Samples for UCL
	BENZENE	ug/m3	6.23	No UCL	11.00	2.8	ug/m^3	11.0	ug/m^3	Max	Too Few Samples for UCL
	CARBON TETRACHLORIDE	ug/m3	0.60	No UCL	0.65	0.6	ug/m^3	0.7	ug/m^3	Max	Too Few Samples for UCL
	CHLOROFORM	ug/m3	0.16	No UCL	0.25	0.3	ug/m^3	0.3	ug/m^3	Max	Too Few Samples for UCL
	DICHLORODIFLUOROMETHANE	ug/m3	2.45	No UCL	3	1.4	ug/m^3	3.1	ug/m^3	Max	Too Few Samples for UCL
	ETHYLBENZENE	ug/m3	6.85	No UCL	16	3.2	ug/m^3	16.0	ug/m^3	Max	Too Few Samples for UCL
	M,P-XYLENES	ug/m3	33.50	No UCL	82.0	14.0	ug/m^3	82.0	ug/m^3	Max	Too Few Samples for UCL
	METHYLENE CHLORIDE	ug/m3	78.23	No UCL	260	1.8	ug/m^3	260.0	ug/m^3	Max	Too Few Samples for UCL
	O-XYLENE	ug/m3	7.63	No UCL	17.0	2.9	ug/m^3	17.0	ug/m^3	Max	Too Few Samples for UCL
	TETRACHLOROETHENE	ug/m3	6.20	No UCL	13.0	1.0	ug/m^3	13.0	ug/m^3	Max	Too Few Samples for UCL
	TOLUENE	ug/m3	70.00	No UCL	170.0	34.0	ug/m^3	170.0	ug/m^3	Max	Too Few Samples for UCL
	TRICHLOROETHENE	ug/m3	1.67	No UCL	3.3	0.3	ug/m^3	3.3	ug/m^3	Max	Too Few Samples for UCL
	TRICHLOROFLUOROMETHANE (FREON 11)	ug/m3	3.68	No UCL	5.9	2.0	ug/m^7	5.9	ug/m^7	Max	Too Few Samples for UCL

Statistics: Maximum Detected Value (Max); 95% UCL of Normal Data (95% UCL-N); 95% UCL of Log-transformed Data (95% UCL-T); Non-parametric (UCL-NP); 95% UCL assuming Gamma distribution (95% G-UCL).
(1) The arithmetic mean and the 95UCL were calculated including half the detection limit for the non-detects. As a result, in some cases these values are above the maximum detected.
(2) Due to the small dataset, 95% UCL was not calculated. Minimum and maximum detections were used to represent the range of exposure concentrations.
ug/m^3: microgram per cubic meter.

TABLE 4-10 - Parcel Site - Star City Auto Body - Indoor Air
MEDIUM-SPECIFIC EXPOSURE POINT CONCENTRATION SUMMARY
Omega Chemical Site - Whittier, California

Scenario Timeframe:	Current
Medium:	Indoor Air
Exposure Medium:	Indoor Air

Exposure Point	Chemical of Potential Concern	Units	Arithmetic Mean [1]	95% UCL of Distribution [1]	Maximum Detected Concentration	Exposure Point Concentrations					
						Minimum Detected Value	Units	Maximum EPC Value	Units	Statistic [2]	Rationale
Indoor Air											
	1,1,1-TRICHLOROETHANE	ug/m3	2.92	No UCL	0.33	0.32	ug/m^3	0.33	ug/m^3	Max	Too Few Samples for UCL
	1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE	ug/m3	16.65	No UCL	31	5.6	ug/m^3	31	ug/m^3	Max	Too Few Samples for UCL
	1,1-DICHLOROETHENE	ug/m3	9.61	No UCL	18	1.6	ug/m^3	18	ug/m^3	Max	Too Few Samples for UCL
	ACETONE	ug/m3	3222.50	No UCL	6000	330	ug/m^3	6000	ug/m^3	Max	Too Few Samples for UCL
	BENZENE	ug/m3	6.11	No UCL	5.3	2.6	ug/m^3	5.3	ug/m^3	Max	Too Few Samples for UCL
	CARBON TETRACHLORIDE	ug/m3	3.47	No UCL	0.67	0.66	ug/m^3	0.67	ug/m^3	Max	Too Few Samples for UCL
	CHLOROFORM	ug/m3	2.58	No UCL	0.19	0.19	ug/m^3	0.19	ug/m^3	Max	Too Few Samples for UCL
	DICHLORODIFLUOROMETHANE	ug/m3	3.70	No UCL	2.7	1.9	ug/m^3	2.7	ug/m^3	Max	Too Few Samples for UCL
	ETHYLBENZENE	ug/m3	17.15	No UCL	48	4.6	ug/m^3	48	ug/m^3	Max	Too Few Samples for UCL
	M,P-XYLENES	ug/m3	88.38	No UCL	270	21	ug/m^3	270	ug/m^3	Max	Too Few Samples for UCL
	METHYLENE CHLORIDE	ug/m3	19.70	No UCL	4.8	1.5	ug/m^3	4.8	ug/m^3	Max	Too Few Samples for UCL
	O-XYLENE	ug/m3	25.94	No UCL	78	5.1	ug/m^3	78	ug/m^3	Max	Too Few Samples for UCL
	TETRACHLOROETHENE	ug/m3	16.88	No UCL	34	6	ug/m^3	34	ug/m^3	Max	Too Few Samples for UCL
	TOLUENE	ug/m3	735.25	No UCL	2400	36	ug/m^3	2400	ug/m^3	Max	Too Few Samples for UCL
	TRICHLOROETHENE	ug/m3	5.13	No UCL	6.5	3.5	ug/m^3	6.5	ug/m^3	Max	Too Few Samples for UCL
	TRICHLOROFLUOROMETHANE (FREON 11)	ug/m3	9.01	No UCL	14	11	ug/m^3	14	ug/m^3	Max	Too Few Samples for UCL

Statistics: Maximum Detected Value (Max); 95% UCL of Normal Data (95% UCL-N); 95% UCL of Log-transformed Data (95% UCL-T); Non-parametric (UCL-NP); 95% UCL assuming Gamma distribution (95% G-UCL).
(1) The arithmetic mean and the 95UCL were calculated including half the detection limit for the non-detects. As a result, in some cases these values are above the maximum detected.
(2) Due to the small dataset, 95% UCL was not calculated. Minimum and maximum detections were used to represent the range of exposure concentrations.
ug/m^3: microgram per cubic meter.

TABLE 4-11 - Parcel North - Medlin & Sons 12484 - Indoor Air
MEDIUM-SPECIFIC EXPOSURE POINT CONCENTRATION SUMMARY
Omega Chemical Site - Whittier, California

Scenario Timeframe:	Current
Medium:	Indoor Air
Exposure Medium:	Indoor Air

Exposure Point	Chemical of Potential Concern	Units	Arithmetic Mean [1]	95% UCL of Distribution [1]	Maximum Detected Concentration	Exposure Point Concentrations					
						Minimum Detected Value	Units	Maximum EPC Value	Units	Statistic [2]	Rationale
Indoor Air											
	1,1,1-TRICHLOROETHANE	ug/m3	0.16	No UCL	0.21	0.21	ug/m^3	0.21	ug/m^3	Max	Too Few Samples for UCL
	1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE	ug/m3	31.75	No UCL	40	17	ug/m^3	40	ug/m^3	Max	Too Few Samples for UCL
	1,1-DICHLOROETHENE	ug/m3	6.15	No UCL	10	2.9	ug/m^3	10	ug/m^3	Max	Too Few Samples for UCL
	1,4-DICHLOROBENZENE	ug/m3	0.34	No UCL	0.95	0.2	ug/m^3	0.95	ug/m^3	Max	Too Few Samples for UCL
	ACETONE	ug/m3	997.75	No UCL	3400	22	ug/m^3	3400	ug/m^3	Max	Too Few Samples for UCL
	BENZENE	ug/m3	1.00	No UCL	1.1	0.91	ug/m^3	1.1	ug/m^3	Max	Too Few Samples for UCL
	CARBON TETRACHLORIDE	ug/m3	0.90	No UCL	1.3	0.67	ug/m^3	1.3	ug/m^3	Max	Too Few Samples for UCL
	CHLOROFORM	ug/m3	0.25	No UCL	0.32	0.2	ug/m^3	0.32	ug/m^3	Max	Too Few Samples for UCL
	DICHLORODIFLUOROMETHANE	ug/m3	2.23	No UCL	3.3	1.2	ug/m^3	3.3	ug/m^3	Max	Too Few Samples for UCL
	ETHYLBENZENE	ug/m3	0.79	No UCL	0.85	0.72	ug/m^3	0.85	ug/m^3	Max	Too Few Samples for UCL
	M,P-XYLENES	ug/m3	2.53	No UCL	2.7	2.2	ug/m^3	2.7	ug/m^3	Max	Too Few Samples for UCL
	METHYLENE CHLORIDE	ug/m3	2.84	No UCL	5.1	1.7	ug/m^3	5.1	ug/m^3	Max	Too Few Samples for UCL
	O-XYLENE	ug/m3	0.94	No UCL	1	0.87	ug/m^3	1	ug/m^3	Max	Too Few Samples for UCL
	TETRACHLOROETHENE	ug/m3	9.28	No UCL	22	4.3	ug/m^3	22	ug/m^3	Max	Too Few Samples for UCL
	TOLUENE	ug/m3	6.20	No UCL	7.4	4.8	ug/m^3	7.4	ug/m^3	Max	Too Few Samples for UCL
	TRICHLOROETHENE	ug/m3	5.40	No UCL	14	2.3	ug/m^3	14	ug/m^3	Max	Too Few Samples for UCL
	TRICHLOROFLUOROMETHANE (FREON 11)	ug/m3	8.75	No UCL	12	5.4	ug/m^3	12	ug/m^3	Max	Too Few Samples for UCL

Statistics: Maximum Detected Value (Max); 95% UCL of Normal Data (95% UCL-N); 95% UCL of Log-transformed Data (95% UCL-T); Non-parametric (UCL-NP); 95% UCL assuming Gamma distribution (95% G-UCL).
(1) The arithmetic mean and the 95UCL were calculated including half the detection limit for the non-detects. As a result, in some cases these values are above the maximum detected.
(2) Due to the small dataset, 95% UCL was not calculated. Minimum and maximum detections were used to represent the range of exposure concentrations.
ug/m^3: microgram per cubic meter.

TABLE 4-12 - Parcel North - Medlin & Sons North 12476 - Indoor Air
MEDIUM-SPECIFIC EXPOSURE POINT CONCENTRATION SUMMARY
Omega Chemical Site - Whittier, California

Scenario Timeframe:	Current
Medium:	Indoor Air
Exposure Medium:	Indoor Air

Exposure Point	Chemical of Potential Concern	Units	Arithmetic Mean [1]	95% UCL of Distribution [1]	Maximum Detected Concentration	Exposure Point Concentrations					
						Minimum Detected Value	Units	Maximum EPC Value	Units	Statistic [2]	Rationale
Indoor Air	1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE	ug/m3		No UCL	1.9	1.9	ug/m^3	1.9	ug/m^3	Max	Too Few Samples for UCL
	ACETONE	ug/m3		No UCL	430.0	430.0	ug/m^3	430	ug/m^3	Max	Too Few Samples for UCL
	DICHLORODIFLUOROMETHANE	ug/m3		No UCL	2.6	2.60	ug/m^3	2.6	ug/m^3	Max	Too Few Samples for UCL
	TOLUENE	ug/m3		No UCL	2.8	2.80	ug/m^3	2.8	ug/m^3	Max	Too Few Samples for UCL
	TRICHLOROFLUOROMETHANE (FREON 11)	ug/m3		No UCL	1.6	1.6	ug/m^3	1.6	ug/m^3	Max	Too Few Samples for UCL

Statistics: Maximum Detected Value (Max); 95% UCL of Normal Data (95% UCL-N); 95% UCL of Log-transformed Data (95% UCL-T); Non-parametric (UCL-NP); 95% UCL assuming Gamma distribution (95% G-UCL).
(1) The arithmetic mean and the 95UCL were calculated including half the detection limit for the non-detects. As a result, in some cases these values are above the maximum detected.
(2) Due to the small dataset, 95% UCL was not calculated. Minimum and maximum detections were used to represent the range of exposure concentrations.
ug/m^3: microgram per cubic meter.

TABLE 4-13 - Parcel West - Terrapave - Indoor Air
MEDIUM-SPECIFIC EXPOSURE POINT CONCENTRATION SUMMARY
Omega Chemical Site - Whittier, California

Scenario Timeframe:	Current
Medium:	Indoor Air
Exposure Medium:	Indoor Air

Exposure Point	Chemical of Potential Concern	Units	Arithmetic Mean [1]	95% UCL of Distribution [1]	Maximum Detected Concentration	Exposure Point Concentrations					
						Minimum Detected Value	Units	Maximum EPC Value	Units	Statistic [2]	Rationale
Indoor Air											
	1,1,1-TRICHLOROETHANE	ug/m3	0.28	No UCL	0.49	0.45	ug/m^3	0.49	ug/m^3	Max	Too Few Samples for UCL
	1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE	ug/m3	16.28	No UCL	26	6.3	ug/m^3	26	ug/m^3	Max	Too Few Samples for UCL
	1,1-DICHLOROETHENE	ug/m3	13.88	No UCL	23	5.5	ug/m^3	23	ug/m^3	Max	Too Few Samples for UCL
	1,4-DICHLOROBENZENE	ug/m3	0.18	No UCL	0.27	0.23	ug/m^3	0.27	ug/m^3	Max	Too Few Samples for UCL
	ACETONE	ug/m3	35.75	No UCL	43	22	ug/m^3	43	ug/m^3	Max	Too Few Samples for UCL
	BENZENE	ug/m3	1.25	No UCL	1.4	1.1	ug/m^3	1.4	ug/m^3	Max	Too Few Samples for UCL
	CARBON TETRACHLORIDE	ug/m3	0.62	No UCL	0.67	0.56	ug/m^3	0.67	ug/m^3	Max	Too Few Samples for UCL
	CHLOROFORM	ug/m3	0.22	No UCL	0.24	0.21	ug/m^3	0.24	ug/m^3	Max	Too Few Samples for UCL
	DICHLORODIFLUOROMETHANE	ug/m3	2.25	No UCL	2.9	1.5	ug/m^3	2.9	ug/m^3	Max	Too Few Samples for UCL
	ETHYLBENZENE	ug/m3	1.25	No UCL	1.6	0.93	ug/m^3	1.6	ug/m^3	Max	Too Few Samples for UCL
	M,P-XYLENES	ug/m3	4.43	No UCL	5.5	3.3	ug/m^3	5.5	ug/m^3	Max	Too Few Samples for UCL
	METHYLENE CHLORIDE	ug/m3	1.35	No UCL	1.5	1.2	ug/m^3	1.5	ug/m^3	Max	Too Few Samples for UCL
	O-XYLENE	ug/m3	1.54	No UCL	2.1	0.96	ug/m^3	2.1	ug/m^3	Max	Too Few Samples for UCL
	TETRACHLOROETHENE	ug/m3	73.50	No UCL	110	39	ug/m^3	110	ug/m^3	Max	Too Few Samples for UCL
	TOLUENE	ug/m3	8.03	No UCL	10	6.5	ug/m^3	10	ug/m^3	Max	Too Few Samples for UCL
	TRICHLOROETHENE	ug/m3	2.93	No UCL	4.4	1.6	ug/m^3	4.4	ug/m^3	Max	Too Few Samples for UCL
	TRICHLOROFLUOROMETHANE (FREON 11)	ug/m3	5.18	No UCL	7	3.4	ug/m^3	7	ug/m^3	Max	Too Few Samples for UCL

Statistics: Maximum Detected Value (Max); 95% UCL of Normal Data (95% UCL-N); 95% UCL of Log-transformed Data (95% UCL-T); Non-parametric (UCL-NP); 95% UCL assuming Gamma distribution (95% G-UCL).
(1) The arithmetic mean and the 95UCL were calculated including half the detection limit for the non-detects. As a result, in some cases these values are above the maximum detected.
(2) Due to the small dataset, 95% UCL was not calculated. Minimum and maximum detections were used to represent the range of exposure concentrations.
ug/m^3: microgram per cubic meter.

TABLE 4-14 - Parcel South - Bishop - Indoor Air
MEDIUM-SPECIFIC EXPOSURE POINT CONCENTRATION SUMMARY
Omega Chemical Site - Whittier, California

Scenario Timeframe:	Current
Medium:	Indoor Air
Exposure Medium:	Indoor Air

Exposure Point	Chemical of Potential Concern	Units	Arithmetic Mean [1]	95% UCL of Distribution [1]	Maximum Detected Concentration	Exposure Point Concentrations					
						Minimum Detected Value	Units	Maximum EPC Value	Units	Statistic [2]	Rationale
Indoor Air	1,1,1-TRICHLOROETHANE	ug/m3	0.12	No UCL	0.19	0.19	ug/m^3	0.19	ug/m^3	Max	Too Few Samples for UCL
	1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE	ug/m3	5.78	No UCL	10	3.4	ug/m^3	10	ug/m^3	Max	Too Few Samples for UCL
	1,1-DICHLOROETHENE	ug/m3	7.72	No UCL	14	3.6	ug/m^3	14	ug/m^3	Max	Too Few Samples for UCL
	1,4-DICHLOROBENZENE	ug/m3	0.21	No UCL	0.32	0.21	ug/m^3	0.32	ug/m^3	Max	Too Few Samples for UCL
	ACETONE	ug/m3	33.33	No UCL	41	28	ug/m^3	41	ug/m^3	Max	Too Few Samples for UCL
	BENZENE	ug/m3	1.18	No UCL	1.2	1.15	ug/m^3	1.2	ug/m^3	Max	Too Few Samples for UCL
	CARBON TETRACHLORIDE	ug/m3	0.54	No UCL	0.575	0.51	ug/m^3	0.575	ug/m^3	Max	Too Few Samples for UCL
	CHLOROFORM	ug/m3	0.14	No UCL	0.18	0.15	ug/m^3	0.18	ug/m^3	Max	Too Few Samples for UCL
	DICHLORODIFLUOROMETHANE	ug/m3	2.87	No UCL	3	2.7	ug/m^3	3	ug/m^3	Max	Too Few Samples for UCL
	ETHYLBENZENE	ug/m3	1.17	No UCL	1.7	0.81	ug/m^3	1.7	ug/m^3	Max	Too Few Samples for UCL
	M,P-XYLENES	ug/m3	3.77	No UCL	4.9	2.7	ug/m^3	4.9	ug/m^3	Max	Too Few Samples for UCL
	METHYL TERT-BUTYL ETHER	ug/m3	0.41	No UCL	0.67	0.67	ug/m^3	0.67	ug/m^3	Max	Too Few Samples for UCL
	METHYLENE CHLORIDE	ug/m3	1.08	No UCL	1.7	1	ug/m^3	1.7	ug/m^3	Max	Too Few Samples for UCL
	O-XYLENE	ug/m3	1.37	No UCL	1.7	1.015	ug/m^3	1.7	ug/m^3	Max	Too Few Samples for UCL
	TETRACHLOROETHENE	ug/m3	15.42	No UCL	29	7.1	ug/m^3	29	ug/m^3	Max	Too Few Samples for UCL
	TOLUENE	ug/m3	7.47	No UCL	8.4	6.9	ug/m^3	8.4	ug/m^3	Max	Too Few Samples for UCL
	TRICHLOROETHENE	ug/m3	0.82	No UCL	1.5	0.44	ug/m^3	1.5	ug/m^3	Max	Too Few Samples for UCL
	TRICHLOROFLUOROMETHANE (FREON 11)	ug/m3	2.75	No UCL	3.7	2.2	ug/m^3	3.7	ug/m^3	Max	Too Few Samples for UCL

Statistics: Maximum Detected Value (Max); 95% UCL of Normal Data (95% UCL-N); 95% UCL of Log-transformed Data (95% UCL-T); Non-parametric (UCL-NP); 95% UCL assuming Gamma distribution (95% G-UCL).

(1) The arithmetic mean and the 95UCL were calculated including half the detection limit for the non-detects. As a result, in some cases these values are above the maximum detected.

(2) Due to the small dataset, 95% UCL was not calculated. Minimum and maximum detections were used to represent the range of exposure concentrations.

ug/m^3: microgram per cubic meter.

TABLE 4-15 - Parcel South - LA Carts - Indoor Air
MEDIUM-SPECIFIC EXPOSURE POINT CONCENTRATION SUMMARY
Omega Chemical Site - Whittier, California

Scenario Timeframe:	Current
Medium:	Indoor Air
Exposure Medium:	Indoor Air

Exposure Point	Chemical of Potential Concern	Units	Arithmetic Mean [1]	95% UCL of Distribution [1]	Maximum Detected Concentration	Exposure Point Concentrations					
						Minimum Detected Value	Units	Maximum EPC Value	Units	Statistic [2]	Rationale
Indoor Air											
	1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE	ug/m3	7.80	No UCL	14	0.70	ug/m^3	14	ug/m^3	Max	Too Few Samples for UCL
	1,1-DICHLOROETHENE	ug/m3	2.05	No UCL	3.6	0.06	ug/m^3	3.6	ug/m^3	Max	Too Few Samples for UCL
	1,4-DICHLOROBENZENE	ug/m3	0.29	No UCL	0.16	0.16	ug/m^3	0.16	ug/m^3	Max	Too Few Samples for UCL
	ACETONE	ug/m3	584.67	No UCL	1200	74.00	ug/m^3	1200	ug/m^3	Max	Too Few Samples for UCL
	BENZENE	ug/m3	1.70	No UCL	2.2	1.30	ug/m^3	2.2	ug/m^3	Max	Too Few Samples for UCL
	CARBON TETRACHLORIDE	ug/m3	0.51	No UCL	0.52	0.50	ug/m^3	0.52	ug/m^3	Max	Too Few Samples for UCL
	CHLOROFORM	ug/m3	0.30	No UCL	0.37	0.14	ug/m^3	0.37	ug/m^3	Max	Too Few Samples for UCL
	DICHLORODIFLUOROMETHANE	ug/m3	2.90	No UCL	3.2	2.60	ug/m^3	3.2	ug/m^3	Max	Too Few Samples for UCL
	ETHYLBENZENE	ug/m3	1.38	No UCL	2	0.95	ug/m^3	2	ug/m^3	Max	Too Few Samples for UCL
	M,P-XYLENES	ug/m3	4.90	No UCL	7.30	2.90	ug/m^3	7.3	ug/m^3	Max	Too Few Samples for UCL
	METHYLENE CHLORIDE	ug/m3	4.65	No UCL	5.9	5.20	ug/m^3	5.9	ug/m^3	Max	Too Few Samples for UCL
	O-XYLENE	ug/m3	1.77	No UCL	2.6	1.00	ug/m^3	2.6	ug/m^3	Max	Too Few Samples for UCL
	TETRACHLOROETHENE	ug/m3	0.80	No UCL	1.6	0.24	ug/m^3	1.6	ug/m^3	Max	Too Few Samples for UCL
	TOLUENE	ug/m3	263.33	No UCL	570	10.00	ug/m^3	570	ug/m^3	Max	Too Few Samples for UCL
	TRICHLOROETHENE	ug/m3	0.61	No UCL	1.2	1.20	ug/m^3	1.2	ug/m^3	Max	Too Few Samples for UCL
	TRICHLOROFLUOROMETHANE (FREON 11)	ug/m3	2.53	No UCL	3.2	1.50	ug/m^3	3.2	ug/m^3	Max	Too Few Samples for UCL

Statistics: Maximum Detected Value (Max); 95% UCL of Normal Data (95% UCL-N); 95% UCL of Log-transformed Data (95% UCL-T); Non-parametric (UCL-NP); 95% UCL assuming Gamma distribution (95% G-UCL).
(1) The arithmetic mean and the 95UCL were calculated including half the detection limit for the non-detects. As a result, in some cases these values are above the maximum detected.
(2) Due to the small dataset, 95% UCL was not calculated. Minimum and maximum detections were used to represent the range of exposure concentrations.
ug/m^3: microgram per cubic meter.

TABLE 4-16 - Parcel South - Oncology Care - Indoor Air
MEDIUM-SPECIFIC EXPOSURE POINT CONCENTRATION SUMMARY
Omega Chemical Site - Whittier, California

Scenario Timeframe:	Current
Medium:	Indoor Air
Exposure Medium:	Indoor Air

Exposure Point	Chemical of Potential Concern	Units	Arithmetic Mean [1]	95% UCL of Distribution [1]	Maximum Detected Concentration	Exposure Point Concentrations					
						Minimum Detected Value	Units	Maximum EPC Value	Units	Statistic [2]	Rationale
Indoor Air											
	1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE	ug/m3	1.40	No UCL	1.6	1.2	ug/m^3	1.6	ug/m^3	Max	Too Few Samples for UCL
	1,1-DICHLOROETHENE	ug/m3	0.22	No UCL	0.23	0.2	ug/m^3	0.23	ug/m^3	Max	Too Few Samples for UCL
	1,2-DICHLOROETHANE	ug/m3	0.23	No UCL	0.32	0.32	ug/m^3	0.32	ug/m^3	Max	Too Few Samples for UCL
	1,4-DICHLOROBENZENE	ug/m3	0.29	No UCL	0.39	0.39	ug/m^3	0.39	ug/m^3	Max	Too Few Samples for UCL
	ACETONE	ug/m3	97.00	No UCL	99	95	ug/m^3	99	ug/m^3	Max	Too Few Samples for UCL
	BENZENE	ug/m3	1.15	No UCL	1.2	1.1	ug/m^3	1.2	ug/m^3	Max	Too Few Samples for UCL
	CARBON TETRACHLORIDE	ug/m3	0.51	No UCL	0.52	0.5	ug/m^3	0.52	ug/m^3	Max	Too Few Samples for UCL
	CHLOROFORM	ug/m3	0.62	No UCL	0.66	0.57	ug/m^3	0.66	ug/m^3	Max	Too Few Samples for UCL
	DICHLORODIFLUOROMETHANE	ug/m3	3.15	No UCL	3.4	2.9	ug/m^3	3.4	ug/m^3	Max	Too Few Samples for UCL
	ETHYLBENZENE	ug/m3	0.97	No UCL	1	0.94	ug/m^3	1	ug/m^3	Max	Too Few Samples for UCL
	M,P-XYLENES	ug/m3	3.05	No UCL	3.1	3	ug/m^3	3.1	ug/m^3	Max	Too Few Samples for UCL
	O-XYLENE	ug/m3	1.25	No UCL	1.3	1.2	ug/m^3	1.3	ug/m^3	Max	Too Few Samples for UCL
	TETRACHLOROETHENE	ug/m3	0.33	No UCL	0.44	0.44	ug/m^3	0.44	ug/m^3	Max	Too Few Samples for UCL
	TOLUENE	ug/m3	16.50	No UCL	17	16	ug/m^3	17	ug/m^3	Max	Too Few Samples for UCL
	TRICHLOROFLUOROMETHANE (FREON 11)	ug/m3	1.75	No UCL	1.8	1.7	ug/m^3	1.8	ug/m^3	Max	Too Few Samples for UCL

Statistics: Maximum Detected Value (Max); 95% UCL of Normal Data (95% UCL-N); 95% UCL of Log-transformed Data (95% UCL-T); Non-parametric (UCL-NP); 95% UCL assuming Gamma distribution (95% G-UCL).

(1) The arithmetic mean and the 95UCL were calculated including half the detection limit for the non-detects. As a result, in some cases these values are above the maximum detected.

(2) Due to the small dataset, 95% UCL was not calculated. Minimum and maximum detections were used to represent the range of exposure concentrations.

ug/m^3: microgram per cubic meter.

TABLE 4-17 - All Parcels - Ambient Air
MEDIUM-SPECIFIC EXPOSURE POINT CONCENTRATION SUMMARY
Omega Chemical Site - Whittier, California

Scenario Timeframe:	Current
Medium:	Ambient Air
Exposure Medium:	Ambient Air

Exposure Point	Chemical of Potential Concern	Units	Arithmetic Mean [1]	95% UCL of Distribution [1]	Maximum Detected Concentration	Exposure Point Concentrations					
						Minimum Detected Value	Units	Maximum EPC Value	Units	Statistic [2]	Rationale
Ambient Air											
	1,1,1-TRICHLOROETHANE	ug/m3	1.14	10.3	1.1466	1.1466	ug/m^3	1.1466	ug/m^3	Max	UCL is greater than Max
	1,1,2,2-TETRACHLOROETHANE	ug/m3	1.36	12.9	0.39159	0.39159	ug/m^3	0.39159	ug/m^3	Max	UCL is greater than Max
	1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE	ug/m3	2.56	7.8	1.7618	0.71238	ug/m^3	1.7618	ug/m^3	Max	UCL is greater than Max
	1,1-DICHLOROETHENE	ug/m3	0.99	2.3	0.6352	0.13101	ug/m^3	0.6352	ug/m^3	Max	UCL is greater than Max
	1,2-DICHLOROBENZENE	ug/m3	1.32	11.4	0.29449	0.29449	ug/m^3	0.29449	ug/m^3	Max	UCL is greater than Max
	1,4-DICHLOROBENZENE	ug/m3	1.20	11.3	0.39065	0.39065	ug/m^3	0.39065	ug/m^3	Max	UCL is greater than Max
	ACETONE	ug/m3	374.11	3,791.1	3808	14.28	ug/m^3	3791.05403	ug/m^3	UCL-NP	
	BENZENE	ug/m3	1.54	3.6	1.0846	0.7975	ug/m^3	1.0846	ug/m^3	Max	UCL is greater than Max
	CARBON TETRACHLORIDE	ug/m3	1.61	6.1	0.629	0.49062	ug/m^3	0.629	ug/m^3	Max	UCL is greater than Max
	DICHLORODIFLUOROMETHANE	ug/m3	3.33	4.6	3.3165	1.8315	ug/m^3	3.3165	ug/m^3	Max	UCL is greater than Max
	ETHYLBENZENE	ug/m3	1.44	4.4	0.9548	0.434	ug/m^3	0.9548	ug/m^3	Max	UCL is greater than Max
	M,P-XYLENES	ug/m3	2.91	3.9	3.1248	1.302	ug/m^3	3.1248	ug/m^3	Max	UCL is greater than Max
	METHYLENE CHLORIDE	ug/m3	1.69	4.1	2.082	2.082	ug/m^3	2.082	ug/m^3	Max	UCL is greater than Max
	O-XYLENE	ug/m3	1.58	4.5	1.1935	0.434	ug/m^3	1.1935	ug/m^3	Max	UCL is greater than Max
	TETRACHLOROETHENE	ug/m3	2.00	6.7	1.7628	0.5424	ug/m^3	1.7628	ug/m^3	Max	UCL is greater than Max
	TOLUENE	ug/m3	6.33	8.1	15.834	3.6946	ug/m^3	8.12826571	ug/m^3	UCL-NP	
	TRICHLOROETHENE	ug/m3	1.23	10.1	1.074	0.22554	ug/m^3	1.074	ug/m^3	Max	UCL is greater than Max
	TRICHLOROFLUOROMETHANE (FREON 11)	ug/m3	2.61	6.1	1.967	1.5736	ug/m^3	1.967	ug/m^3	Max	UCL is greater than Max

Statistics: Maximum Detected Value (Max); 95% UCL of Normal Data (95% UCL-N); 95% UCL of Log-transformed Data (95% UCL-T); Non-parametric (UCL-NP); 95% UCL assuming Gamma distribution (95% G-UCL).

(1) The arithmetic mean and the 95UCL were calculated including half the detection limit for the non-detects. As a result, in some cases these values are above the maximum detected.

(2) Minimum and maximum detections were used to represent the range of exposure concentrations.

ug/m^3: microgram per cubic meter.

TABLE 4-18 - All Parcels, Future Industrial Worker Exposure
MEDIUM-SPECIFIC EXPOSURE POINT CONCENTRATION SUMMARY
Omega Chemical Site - Whittier, California

Scenario Timeframe:	Future
Medium:	Soil Gas 5 to 6 feet bgs
Exposure Medium:	Indoor Air

Exposure Point	Chemical of Potential Concern	Units	Arithmetic Mean [1]	95% UCL of Distribution [1]	Maximum Detected Concentration	Exposure Point Concentrations									
						EPC Value	Units	EPC Indoor Air Value [2]	Units	Minimum Detected Value	Units	Minimum EPC Indoor Air Value [2]	Units	Statistic [3]	Rationale
Indoor Air															
	1,1,1-TRICHLOROETHANE	ug/m3	70,537	352,624	1,528,800	352,624	ug/m^3	1.2E+02	ug/m^3	141.96	ug/m^3	4.6E-02	ug/m^3	95% UCL-T	
	1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE	ug/m3	1,076,274	1,611,795	3,447,000	1,611,795	ug/m^3	5.3E+02	ug/m^3	1838.40	ug/m^3	6.0E-01	ug/m^3	95% UCL-G	
	1,1-DICHLOROETHANE	ug/m3	7,140	38,423	105,300	38,423	ug/m^3	1.2E+01	ug/m^3	36.45	ug/m^3	1.1E-02	ug/m^3	UCL-NP	
	1,1-DICHLOROETHENE	ug/m3	436,872	659,877	1,071,900	659,877	ug/m^3	2.4E+02	ug/m^3	83.37	ug/m^3	3.0E-02	ug/m^3	95% UCL-G assumed	
	1,2-DICHLORO-1,1,2-TRIFLUOROETHANE	ug/m3	54,172	102,378	93,750	93,750	ug/m^3	ND	ug/m^3	4812.50	ug/m^3	ND	ug/m^3	Max	UCL is greater than Max
	1,2-DICHLOROETHANE	ug/m3	1,453	2,253	10,125	2,253	ug/m^3	8.9E-01	ug/m^3	93.15	ug/m^3	3.7E-02	ug/m^3	95% UCL-G	
	2,2,4-TRIMETHYLPENTANE	ug/m3	1,869	3,105	56	56	ug/m^3	ND	ug/m^3	36.43	ug/m^3	ND	ug/m^3	Max	UCL is greater than Max
	ACETALDEHYDE	ug/m3	97	No UCL	97	97	ug/m^3	4.3E-02	ug/m^3	97.20	ug/m^3	4.3E-02	ug/m^3	Max	No UCL
	ACETONE	ug/m3	4,114	5,971	21,182	5,971	ug/m^3	2.7E+00	ug/m^3	80.92	ug/m^3	3.6E-02	ug/m^3	95% UCL-G	
	BENZENE	ug/m3	961	1,418	2,074	1,418	ug/m^3	5.0E-01	ug/m^3	8.29	ug/m^3	2.9E-03	ug/m^3	95% UCL-G assumed	
	CARBON DISULFIDE	ug/m3	2,973	5,132	26,124	5,132	ug/m^3	2.0E+00	ug/m^3	373.20	ug/m^3	1.5E-01	ug/m^3	95% UCL-G	
	CARBON TETRACHLORIDE	ug/m3	1,716	2,629	233	233	ug/m^3	7.6E-02	ug/m^3	232.73	ug/m^3	7.6E-02	ug/m^3	Max	UCL is greater than Max
	CHLOROFORM	ug/m3	3,858	5,726	14,640	5,726	ug/m^3	2.3E+00	ug/m^3	73.20	ug/m^3	2.9E-02	ug/m^3	95% UCL-G	
	CIS-1,2-DICHLOROETHENE	ug/m3	3,537	17,957	36,828	17,957	ug/m^3	5.6E+00	ug/m^3	285.12	ug/m^3	8.9E-02	ug/m^3	UCL-NP	
	DICHLORODIFLUOROMETHANE	ug/m3	1,628	2,478	9,405	2,478	ug/m^3	7.2E-01	ug/m^3	18.32	ug/m^3	5.3E-03	ug/m^3	95% UCL-G	
	M,P-XYLENES	ug/m3	1,469	2,173	608	608	ug/m^3	1.8E-01	ug/m^3	13.89	ug/m^3	4.2E-03	ug/m^3	Max	UCL is greater than Max
	TETRACHLOROETHENE	ug/m3	811,528	1,225,830	3,390,000	1,225,830	ug/m^3	3.8E+02	ug/m^3	949.20	ug/m^3	2.9E-01	ug/m^3	95% UCL-G assumed	
	TOLUENE	ug/m3	1,113	1,586	2,601	1,586	ug/m^3	5.6E-01	ug/m^3	29.41	ug/m^3	1.0E-02	ug/m^3	95% UCL-G	
	TRANS-1,2-DICHLOROETHENE	ug/m3	4,000	6,704	20,988	6,704	ug/m^3	2.0E+00	ug/m^3	55.44	ug/m^3	1.7E-02	ug/m^3	95% UCL-G	
	TRICHLOROETHENE	ug/m3	122,697	184,300	472,560	184,300	ug/m^3	6.1E+01	ug/m^3	327.57	ug/m^3	1.1E-01	ug/m^3	95% UCL-G	
	TRICHLOROFLUOROMETHANE (FREON 11)	ug/m3	319,226	485,399	1,011,600	485,399	ug/m^3	1.7E+02	ug/m^3	550.76	ug/m^3	1.9E-01	ug/m^3	95% UCL-G	

Statistics: Maximum Detected Value (Max); 95% UCL of Normal Data (95% UCL-N); 95% UCL of Log-transformed Data (95% UCL-T); Non-parametric (UCL-NP); 95% UCL assuming Gamma distribution (95% G-UCL).

(1) The arithmetic mean and the 95UCL were calculated including half the detection limit for the non-detects. As a result, in some cases these values are above the maximum detected.
The Shapiro-Wilk test was used to test the normality/ lognormality of all data sets at the 0.05 significance level. The UCL procedures listed were selected based on the recommendations of the ProUCL statistical program and based on the results of the W Test, the number of samples, and the standard deviation of the log-transformed data.

(2) Soil gas values modeled to provide indoor air concentrations using EPA Advance Soil Gas Model using Johnson and Ettinger algorithms for Commercial Worker Exposure. See Appendix A-4.

ug/m^3: microgram per cubic meter.

ND: Not determined. Indoor air concentration could not be calculated because physical parameters for constituent were not available.

TABLE 4-19 - Site Parcel, Future Resident Exposure
MEDIUM-SPECIFIC EXPOSURE POINT CONCENTRATION SUMMARY
Omega Chemical Site - Whittier, California

Scenario Timeframe:	Future
Medium:	Soil Gas 5 to 6 feet bgs
Exposure Medium:	Indoor Air

Exposure Point	Chemical of Potential Concern	Units	Arithmetic Mean [1]	95% UCL of Distribution [1]	Maximum Detected Concentration	Exposure Point Concentrations									
						EPC Value	Units	EPC Indoor Air Value [2]	Units	Minimum Detected Value	Units	Minimum EPC Indoor Air Value [2]	Units	Statistic [3]	Rationale
Indoor Air															
	1,1,1-TRICHLOROETHANE	ug/m3	107,610	553,427	1,528,800	553,427	ug/m^3	4.1E+02	ug/m^3	1528.80	ug/m^3	1.1E+00	ug/m^3	95% UCL-T	
	1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE	ug/m3	855,013	1,100,465	2,374,600	1,100,465	ug/m^3	8.1E+02	ug/m^3	4979.00	ug/m^3	3.7E+00	ug/m^3	95% UCL-N	
	1,1-DICHLOROETHANE	ug/m3	10,223	19,662	105,300	19,662	ug/m^3	1.4E+01	ug/m^3	36.45	ug/m^3	2.6E-02	ug/m^3	95% UCL-G assumed	
	1,1-DICHLOROETHENE	ug/m3	397,162	626,769	992,500	626,769	ug/m^3	5.1E+02	ug/m^3	6749.00	ug/m^3	5.5E+00	ug/m^3	95% UCL-G	
	1,2-DICHLORO-1,1,2-TRIFLUOROETHANE	ug/m3	40,979	No UCL	81,250	81,250	ug/m^3	ND	ug/m^3	4812.50	ug/m^3	ND	ug/m^3	Max	No UCL
	1,2-DICHLOROETHANE	ug/m3	1,473	2,496	10,125	2,496	ug/m^3	2.2E+00	ug/m^3	93.15	ug/m^3	8.3E-02	ug/m^3	95% UCL-G	
	ACETALDEHYDE	ug/m3	97	No UCL	97	97	ug/m^3	9.7E-02	ug/m^3	97.20	ug/m^3	9.7E-02	ug/m^3	Max	No UCL
	ACETONE	ug/m3	4,576	7,001	21,182	7,001	ug/m^3	7.0E+00	ug/m^3	104.72	ug/m^3	1.1E-01	ug/m^3	95% UCL-G	
	BENZENE	ug/m3	877	1,362	2,074	1,362	ug/m^3	1.1E+00	ug/m^3	44.66	ug/m^3	3.6E-02	ug/m^3	95% UCL-G	
	CARBON DISULFIDE	ug/m3	3,872	7,008	26,124	7,008	ug/m^3	6.3E+00	ug/m^3	373.20	ug/m^3	3.3E-01	ug/m^3	95% UCL-G	
	CARBON TETRACHLORIDE	ug/m3	1,454	2,374	233	233	ug/m^3	1.7E-01	ug/m^3	232.73	ug/m^3	1.7E-01	ug/m^3	Max	UCL is greater than Max
	CHLOROFORM	ug/m3	4,960	7,482	14,640	7,482	ug/m^3	6.7E+00	ug/m^3	92.72	ug/m^3	8.3E-02	ug/m^3	95% UCL-G	
	CIS-1,2-DICHLOROETHENE	ug/m3	4,712	14,326	36,828	14,326	ug/m^3	1.0E+01	ug/m^3	285.12	ug/m^3	2.0E-01	ug/m^3	95% UCL-T	
	DICHLORODIFLUOROMETHANE	ug/m3	1,180	1,882	941	941	ug/m^3	6.2E-01	ug/m^3	64.35	ug/m^3	4.2E-02	ug/m^3	Max	UCL is greater than Max
	TETRACHLOROETHENE	ug/m3	920,601	1,355,479	3,390,000	1,355,479	ug/m^3	9.5E+02	ug/m^3	16272.00	ug/m^3	1.1E+01	ug/m^3	95% UCL-G	
	TOLUENE	ug/m3	936	1,392	1,169	1,169	ug/m^3	9.3E-01	ug/m^3	75.40	ug/m^3	6.0E-02	ug/m^3	Max	
	TRANS-1,2-DICHLOROETHENE	ug/m3	4,756	8,064	20,988	8,064	ug/m^3	5.6E+00	ug/m^3	55.44	ug/m^3	3.8E-02	ug/m^3	95% UCL-G	
	TRICHLOROETHENE	ug/m3	125,451	190,082	451,080	190,082	ug/m^3	1.4E+02	ug/m^3	3060.90	ug/m^3	2.3E+00	ug/m^3	95% UCL-G	
	TRICHLOROFLUOROMETHANE (FREON 11)	ug/m3	274,527	430,192	786,800	430,192	ug/m^3	3.4E+02	ug/m^3	4271.20	ug/m^3	3.4E+00	ug/m^3	95% UCL-G	

Statistics: Maximum Detected Value (Max); 95% UCL of Normal Data (95% UCL-N); 95% UCL of Log-transformed Data (95% UCL-T); Non-parametric (UCL-NP); 95% UCL assuming Gamma distribution (95% G-UCL).

(1) The arithmetic mean and the 95UCL were calculated including half the detection limit for the non-detects. As a result, in some cases these values are above the maximum detected.

The Shapiro-Wilk test was used to test the normality/ lognormality of all data sets at the 0.05 significance level. The UCL procedures listed were selected based on the recommendations of the ProUCL statistical program and based on the results of the W Test, the number of samples, and the standard deviation of the log-transformed data.

(2) Soil gas values modeled to provide indoor air concentrations using EPA Advance Soil Gas Model using Johnson and Ettinger algorithms for Commercial Worker Exposure. See Appendix A-4.

ug/m^3: microgram per cubic meter.

ND: Not determined. Indoor air concentration could not be calculated because physical parameters for constituent were not available.

TABLE 4-20 - Other Parcels, Future Resident Exposure
MEDIUM-SPECIFIC EXPOSURE POINT CONCENTRATION SUMMARY
Omega Chemical Site - Whittier, California

Scenario Timeframe:	Future
Medium:	Soil Gas 5 to 6 feet bgs
Exposure Medium:	Indoor Air

Exposure Point	Chemical of Potential Concern	Units	Arithmetic Mean [1]	95% UCL of Distribution [1]	Maximum Detected Concentration	Exposure Point Concentrations									
						EPC Value	Units	EPC Indoor Air Value [2]	Units	Minimum Detected Value	Units	Minimum EPC Indoor Air Value [2]	Units	Statistic [3]	Rationale
Indoor Air															
	1,1,1-TRICHLOROETHANE	ug/m3	4,106	7,744	10,920	7,744	ug/m^3	5.7E+00	ug/m^3	141.96	ug/m^3	1.0E-01	ug/m^3	95% UCL-G	
	1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE	ug/m3	1,481,920	4,797,958	3,447,000	3,447,000	ug/m^3	2.5E+03	ug/m^3	1838.40	ug/m^3	1.4E+00	ug/m^3	Max	UCL is greater than Max
	1,1-DICHLOROETHANE	ug/m3	1,053	2,231	1,053	1,053	ug/m^3	7.5E-01	ug/m^3	1053.00	ug/m^3	7.5E-01	ug/m^3	Max	UCL is greater than Max
	1,1-DICHLOROETHENE	ug/m3	509,674	729,033	1,071,900	729,033	ug/m^3	5.9E+02	ug/m^3	83.37	ug/m^3	6.8E-02	ug/m^3	95% UCL-N	
	1,2-DICHLORO-1,1,2-TRIFLUOROETHANE	ug/m3	93,750	No UCL	93,750	93,750	ug/m^3	ND	ug/m^3	93750.00	ug/m^3	ND	ug/m^3	Max	No UCL
	2,2,4-TRIMETHYLPENTANE	ug/m3	48	3,856	56	56	ug/m^3	ND	ug/m^3	36.43	ug/m^3	ND	ug/m^3	Max	UCL is greater than Max
	ACETONE	ug/m3	117	7,834	186	186	ug/m^3	1.9E-01	ug/m^3	80.92	ug/m^3	8.1E-02	ug/m^3	Max	UCL is greater than Max
	BENZENE	ug/m3	12	2,770	16	16	ug/m^3	1.3E-02	ug/m^3	8.29	ug/m^3	6.7E-03	ug/m^3	Max	UCL is greater than Max
	CHLOROFORM	ug/m3	915	2,727	1,757	1,757	ug/m^3	1.6E+00	ug/m^3	73.20	ug/m^3	6.5E-02	ug/m^3	Max	UCL is greater than Max
	DICHLORODIFLUOROMETHANE	ug/m3	3,112	7,408	9,405	7,408	ug/m^3	4.9E+00	ug/m^3	18.32	ug/m^3	1.2E-02	ug/m^3	95% UCL-G	
	HEXANE (N-HEXANE)	ug/m3	11	4,175	11	11	ug/m^3	1.4E-02	ug/m^3	10.56	ug/m^3	1.4E-02	ug/m^3	Max	UCL is greater than Max
	M,P-XYLENES	ug/m3	22	5,535	30	30	ug/m^3	2.1E-02	ug/m^3	13.89	ug/m^3	9.5E-03	ug/m^3	Max	UCL is greater than Max
	TETRACHLOROETHENE	ug/m3	611,562	2,167,531	2,101,800	2,101,800	ug/m^3	1.5E+03	ug/m^3	949.20	ug/m^3	6.6E-01	ug/m^3	Max	UCL is greater than Max
	TOLUENE	ug/m3	682	3,253	2,601	2,601	ug/m^3	2.1E+00	ug/m^3	29.41	ug/m^3	2.3E-02	ug/m^3	Max	UCL is greater than Max
	TRANS-1,2-DICHLOROETHENE	ug/m3	8,316	10,748	9,900	9,900	ug/m^3	6.8E+00	ug/m^3	6732.00	ug/m^3	4.6E+00	ug/m^3	Max	UCL is greater than Max
	TRICHLOROETHENE	ug/m3	117,648	393,490	472,560	393,490	ug/m^3	2.9E+02	ug/m^3	327.57	ug/m^3	2.4E-01	ug/m^3	95% UCL-G	
	TRICHLOROFLUOROMETHANE (FREON 11)	ug/m3	401,176	1,316,299	1,011,600	1,011,600	ug/m^3	8.0E+02	ug/m^3	550.76	ug/m^3	4.4E-01	ug/m^3	Max	UCL is greater than Max

Statistics: Maximum Detected Value (Max); 95% UCL of Normal Data (95% UCL-N); 95% UCL of Log-transformed Data (95% UCL-T); Non-parametric (UCL-NP); 95% UCL assuming Gamma distribution (95% G-UCL).

(1) The arithmetic mean and the 95UCL were calculated including half the detection limit for the non-detects. As a result, in some cases these values are above the maximum detected.
The Shapiro-Wilk test was used to test the normality/ lognormality of all data sets at the 0.05 significance level. The UCL procedures listed were selected based on the recommendations of the ProUCL statistical program and based on the results of the W Test, the number of samples, and the standard deviation of the log-transformed data.

(2) Soil gas values modeled to provide indoor air concentrations using EPA Advance Soil Gas Model using Johnson and Ettinger algorithms for Commercial Worker Exposure. See Appendix A-4.

ug/m^3: microgram per cubic meter.

ND: Not determined. Indoor air concentration could not be calculated because physical parameters for constituent were not available.

TABLE 4-21 - All Parcels, Future Industrial Worker Exposure
MEDIUM-SPECIFIC EXPOSURE POINT CONCENTRATION SUMMARY
Omega Chemical Site - Whittier, California

Scenario Timeframe:	Future
Medium:	Soil Gas 5 to 6 feet bgs
Exposure Medium:	Ambient Air

Exposure Point	Chemical of Potential Concern	Units	Arithmetic Mean [1]	95% UCL of Distribution [1]	Maximum Detected Concentration	Exposure Point Concentrations									
						EPC Value	Units	EPC Ambient Air Value [2]	Units	Minimum Detected Value	Units	Minimum EPC Ambient Air Value [2]	Units	Statistic [3]	Rationale
Ambient Air															
	1,1,1-TRICHLOROETHANE	ug/m3	70,537	352,624	1,528,800	352,624	ug/m^3	1.6E+01	ug/m^3	141.96	ug/m^3	6.4E-03	ug/m^3	95% UCL-T	
	1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE	ug/m3	1,076,274	1,611,795	3,447,000	1,611,795	ug/m^3	2.7E+01	ug/m^3	1838.40	ug/m^3	3.1E-02	ug/m^3	95% UCL-G	
	1,1-DICHLOROETHANE	ug/m3	7,140	38,423	105,300	38,423	ug/m^3	1.6E+00	ug/m^3	36.45	ug/m^3	1.6E-03	ug/m^3	UCL-NP	
	1,1-DICHLOROETHENE	ug/m3	436,872	659,877	1,071,900	659,877	ug/m^3	3.4E+01	ug/m^3	83.37	ug/m^3	4.3E-03	ug/m^3	95% UCL-G assumed	
	1,2-DICHLORO-1,1,2-TRIFLUOROETHANE	ug/m3	54,172	102,378	93,750	93,750	ug/m^3	ND	ug/m^3	4812.50	ug/m^3	ND	ug/m^3	Max	UCL is greater than Max
	1,2-DICHLOROETHANE	ug/m3	1,453	2,253	10,125	2,253	ug/m^3	1.3E-01	ug/m^3	93.15	ug/m^3	5.6E-03	ug/m^3	95% UCL-G	
	2,2,4-TRIMETHYLPENTANE	ug/m3	1,869	3,105	56	56	ug/m^3	ND	ug/m^3	36.43	ug/m^3	ND	ug/m^3	Max	UCL is greater than Max
	ACETALDEHYDE	ug/m3	97	No UCL	97	97	ug/m^3	6.9E-03	ug/m^3	97.20	ug/m^3	6.9E-03	ug/m^3	Max	No UCL
	ACETONE	ug/m3	4,114	5,971	21,182	5,971	ug/m^3	4.3E-01	ug/m^3	80.92	ug/m^3	5.8E-03	ug/m^3	95% UCL-G	
	BENZENE	ug/m3	961	1,418	2,074	1,418	ug/m^3	7.2E-02	ug/m^3	8.29	ug/m^3	4.2E-04	ug/m^3	95% UCL-G assumed	
	CARBON DISULFIDE	ug/m3	2,973	5,132	26,124	5,132	ug/m^3	3.1E-01	ug/m^3	373.20	ug/m^3	2.2E-02	ug/m^3	95% UCL-G	
	CARBON TETRACHLORIDE	ug/m3	1,716	2,629	233	233	ug/m^3	1.0E-02	ug/m^3	232.73	ug/m^3	1.0E-02	ug/m^3	Max	UCL is greater than Max
	CHLOROFORM	ug/m3	3,858	5,726	14,640	5,726	ug/m^3	3.4E-01	ug/m^3	73.20	ug/m^3	4.4E-03	ug/m^3	95% UCL-G	
	CIS-1,2-DICHLOROETHENE	ug/m3	3,537	17,957	36,828	17,957	ug/m^3	7.6E-01	ug/m^3	285.12	ug/m^3	1.2E-02	ug/m^3	UCL-NP	
	DICHLORODIFLUOROMETHANE	ug/m3	1,628	2,478	9,405	2,478	ug/m^3	1.1E-01	ug/m^3	18.32	ug/m^3	8.4E-04	ug/m^3	95% UCL-G	
	M,P-XYLENES	ug/m3	1,469	2,173	608	608	ug/m^3	2.5E-02	ug/m^3	13.89	ug/m^3	5.6E-04	ug/m^3	Max	UCL is greater than Max
	TETRACHLOROETHENE	ug/m3	811,528	1,225,830	3,390,000	1,225,830	ug/m^3	5.1E+01	ug/m^3	949.20	ug/m^3	3.9E-02	ug/m^3	95% UCL-G assumed	
	TOLUENE	ug/m3	1,113	1,586	2,601	1,586	ug/m^3	7.9E-02	ug/m^3	29.41	ug/m^3	1.5E-03	ug/m^3	95% UCL-G	
	TRANS-1,2-DICHLOROETHENE	ug/m3	4,000	6,704	20,988	6,704	ug/m^3	2.7E-01	ug/m^3	55.44	ug/m^3	2.3E-03	ug/m^3	95% UCL-G	
	TRICHLOROETHENE	ug/m3	122,697	184,300	472,560	184,300	ug/m^3	8.4E+00	ug/m^3	327.57	ug/m^3	1.5E-02	ug/m^3	95% UCL-G	
	TRICHLOROFLUOROMETHANE (FREON 11)	ug/m3	319,226	485,399	1,011,600	485,399	ug/m^3	2.4E+01	ug/m^3	550.76	ug/m^3	2.8E-02	ug/m^3	95% UCL-G	

Statistics: Maximum Detected Value (Max); 95% UCL of Normal Data (95% UCL-N); 95% UCL of Log-transformed Data (95% UCL-T); Non-parametric (UCL-NP); 95% UCL assuming Gamma distribution (95% G-UCL).

(1) The arithmetic mean and the 95UCL were calculated including half the detection limit for the non-detects. As a result, in some cases these values are above the maximum detected.
The Shapiro-Wilk test was used to test the normality/ lognormality of all data sets at the 0.05 significance level. The UCL procedures listed were selected based on the recommendations of the ProUCL statistical program and based on the results of the W Test, the number of samples, and the standard deviation of the log-transformed data.

(2) Soil gas values modeled to provide indoor air concentrations using Karami, et al. (1987) equations along with the USEPA Draft Soil Screening Guidance (1994) to estimate ambient air concentrations from soil gas. See Appendix Tables A6-1 and A6-2.

ug/m^3: microgram per cubic meter.

ND: Not determined. Indoor air concentration could not be calculated because physical parameters for constituent were not available.

TABLE 4-22 - Site Parcel, Future Resident Exposure
MEDIUM-SPECIFIC EXPOSURE POINT CONCENTRATION SUMMARY
Omega Chemical Site - Whittier, California

Scenario Timeframe:	Future
Medium:	Soil Gas 5 to 6 feet bgs
Exposure Medium:	Ambient Air

Exposure Point	Chemical of Potential Concern	Units	Arithmetic Mean [1]	95% UCL of Distribution [1]	Maximum Detected Concentration	Exposure Point Concentrations									
						EPC Value	Units	EPC Ambient Air Value [2]	Units	Minimum Detected Value	Units	Minimum EPC Ambient Air Value [2]	Units	Statistic [3]	Rationale
Ambient Air															
	1,1,1-TRICHLOROETHANE	ug/m3	107,610	553,427	1,528,800	553,427	ug/m^3	2.5E+01	ug/m^3	1528.80	ug/m^3	6.9E-02	ug/m^3	95% UCL-T	
	1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE	ug/m3	855,013	1,100,465	2,374,600	1,100,465	ug/m^3	1.8E+01	ug/m^3	4979.00	ug/m^3	8.3E-02	ug/m^3	95% UCL-N	
	1,1-DICHLOROETHANE	ug/m3	10,223	19,662	105,300	19,662	ug/m^3	8.4E-01	ug/m^3	36.45	ug/m^3	1.6E-03	ug/m^3	95% UCL-G assumed	
	1,1-DICHLOROETHENE	ug/m3	397,162	626,769	992,500	626,769	ug/m^3	3.2E+01	ug/m^3	6749.00	ug/m^3	3.5E-01	ug/m^3	95% UCL-G	
	1,2-DICHLORO-1,1,2-TRIFLUOROETHANE	ug/m3	40,979	No UCL	81,250	81,250	ug/m^3	ND	ug/m^3	4812.50	ug/m^3	ND	ug/m^3	Max	No UCL
	1,2-DICHLOROETHANE	ug/m3	1,473	2,496	10,125	2,496	ug/m^3	1.5E-01	ug/m^3	93.15	ug/m^3	5.6E-03	ug/m^3	95% UCL-G	
	ACETALDEHYDE	ug/m3	97	No UCL	97	97	ug/m^3	6.9E-03	ug/m^3	97.20	ug/m^3	6.9E-03	ug/m^3	Max	No UCL
	ACETONE	ug/m3	4,576	7,001	21,182	7,001	ug/m^3	5.0E-01	ug/m^3	104.72	ug/m^3	7.5E-03	ug/m^3	95% UCL-G	
	BENZENE	ug/m3	877	1,362	2,074	1,362	ug/m^3	6.9E-02	ug/m^3	44.66	ug/m^3	2.3E-03	ug/m^3	95% UCL-G	
	CARBON DISULFIDE	ug/m3	3,872	7,008	26,124	7,008	ug/m^3	4.2E-01	ug/m^3	373.20	ug/m^3	2.2E-02	ug/m^3	95% UCL-G	
	CARBON TETRACHLORIDE	ug/m3	1,454	2,374	233	233	ug/m^3	1.0E-02	ug/m^3	232.73	ug/m^3	1.0E-02	ug/m^3	Max	UCL is greater than Max
	CHLOROFORM	ug/m3	4,960	7,482	14,640	7,482	ug/m^3	4.5E-01	ug/m^3	92.72	ug/m^3	5.6E-03	ug/m^3	95% UCL-G	
	CIS-1,2-DICHLOROETHENE	ug/m3	4,712	14,326	36,828	14,326	ug/m^3	6.1E-01	ug/m^3	285.12	ug/m^3	1.2E-02	ug/m^3	95% UCL-T	
	DICHLORODIFLUOROMETHANE	ug/m3	1,180	1,882	941	941	ug/m^3	4.3E-02	ug/m^3	64.35	ug/m^3	3.0E-03	ug/m^3	Max	UCL is greater than Max
	TETRACHLOROETHENE	ug/m3	920,601	1,355,479	3,390,000	1,355,479	ug/m^3	5.6E+01	ug/m^3	16272.00	ug/m^3	6.7E-01	ug/m^3	95% UCL-G	
	TOLUENE	ug/m3	936	1,392	1,169	1,169	ug/m^3	5.9E-02	ug/m^3	75.40	ug/m^3	3.8E-03	ug/m^3	Max	UCL is greater than Max
	TRANS-1,2-DICHLOROETHENE	ug/m3	4,756	8,064	20,988	8,064	ug/m^3	3.3E-01	ug/m^3	55.44	ug/m^3	2.3E-03	ug/m^3	95% UCL-G	
	TRICHLOROETHENE	ug/m3	125,451	190,082	451,080	190,082	ug/m^3	8.7E+00	ug/m^3	3060.90	ug/m^3	1.4E-01	ug/m^3	95% UCL-G	
	TRICHLOROFLUOROMETHANE (FREON 11)	ug/m3	274,527	430,192	786,800	430,192	ug/m^3	2.2E+01	ug/m^3	4271.20	ug/m^3	2.1E-01	ug/m^3	95% UCL-G	

Statistics: Maximum Detected Value (Max); 95% UCL of Normal Data (95% UCL-N); 95% UCL of Log-transformed Data (95% UCL-T); Non-parametric (UCL-NP); 95% UCL assuming Gamma distribution (95% G-UCL).

(1) The arithmetic mean and the 95UCL were calculated including half the detection limit for the non-detects. As a result, in some cases these values are above the maximum detected.
The Shapiro-Wilk test was used to test the normality/ lognormality of all data sets at the 0.05 significance level. The UCL procedures listed were selected based on the recommendations of the ProUCL statistical program and based on the results of the W Test, the number of samples, and the standard deviation of the log-transformed data.

(2) Soil gas values modeled to provide indoor air concentrations using Karami, et al. (1987) equations along with the USEPA Draft Soil Screening Guidance (1994) to estimate ambient air concentrations from soil gas. See Appendix Tables A6-3 and A6-4.

ug/m^3: microgram per cubic meter.

ND: Not determined. Indoor air concentration could not be calculated because physical parameters for constituent were not available.

TABLE 4-23 - Other Parcels, Future Resident Exposure
MEDIUM-SPECIFIC EXPOSURE POINT CONCENTRATION SUMMARY
Omega Chemical Site - Whittier, California

Scenario Timeframe:	Future
Medium:	Soil Gas 5 to 6 feet bgs
Exposure Medium:	Ambient Air

Exposure Point	Chemical of Potential Concern	Units	Arithmetic Mean [1]	95% UCL of Distribution [1]	Maximum Detected Concentration	Exposure Point Concentrations									
						EPC Value	Units	EPC Ambient Air Value [2]	Units	Minimum Detected Value	Units	Minimum EPC Ambient Air Value [2]	Units	Statistic [3]	Rationale
Ambient Air															
	1,1,1-TRICHLOROETHANE	ug/m3	4,106	7,744	10,920	7,744	ug/m^3	3.5E-01	ug/m^3	141.96	ug/m^3	6.4E-03	ug/m^3	95% UCL-G	
	1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE	ug/m3	1,481,920	4,797,958	3,447,000	3,447,000	ug/m^3	5.7E+01	ug/m^3	1838.40	ug/m^3	3.1E-02	ug/m^3	Max	UCL is greater than Max
	1,1-DICHLOROETHANE	ug/m3	1,053	2,231	1,053	1,053	ug/m^3	4.5E-02	ug/m^3	1053.00	ug/m^3	4.5E-02	ug/m^3	Max	UCL is greater than Max
	1,1-DICHLOROETHENE	ug/m3	509,674	729,033	1,071,900	729,033	ug/m^3	3.8E+01	ug/m^3	83.37	ug/m^3	4.3E-03	ug/m^3	95% UCL-N	
	1,2-DICHLORO-1,1,2-TRIFLUOROETHANE	ug/m3	93,750	No UCL	93,750	93,750	ug/m^3	ND	ug/m^3	93750.00	ug/m^3	ND	ug/m^3	Max	No UCL
	2,2,4-TRIMETHYLPENTANE	ug/m3	48	3,856	56	56	ug/m^3	ND	ug/m^3	36.43	ug/m^3	ND	ug/m^3	Max	UCL is greater than Max
	ACETONE	ug/m3	117	7,834	186	186	ug/m^3	1.3E-02	ug/m^3	80.92	ug/m^3	5.8E-03	ug/m^3	Max	UCL is greater than Max
	BENZENE	ug/m3	12	2,770	16	16	ug/m^3	8.2E-04	ug/m^3	8.29	ug/m^3	4.2E-04	ug/m^3	Max	UCL is greater than Max
	CHLOROFORM	ug/m3	915	2,727	1,757	1,757	ug/m^3	1.1E-01	ug/m^3	73.20	ug/m^3	4.4E-03	ug/m^3	Max	UCL is greater than Max
	DICHLORODIFLUOROMETHANE	ug/m3	3,112	7,408	9,405	7,408	ug/m^3	3.4E-01	ug/m^3	18.32	ug/m^3	8.4E-04	ug/m^3	95% UCL-G	
	HEXANE (N-HEXANE)	ug/m3	11	4,175	11	11	ug/m^3	1.2E-03	ug/m^3	10.56	ug/m^3	1.2E-03	ug/m^3	Max	UCL is greater than Max
	M,P-XYLENES	ug/m3	22	5,535	30	30	ug/m^3	1.2E-03	ug/m^3	13.89	ug/m^3	5.6E-04	ug/m^3	Max	UCL is greater than Max
	TETRACHLOROETHENE	ug/m3	611,562	2,167,531	2,101,800	2,101,800	ug/m^3	8.7E+01	ug/m^3	949.20	ug/m^3	3.9E-02	ug/m^3	Max	UCL is greater than Max
	TOLUENE	ug/m3	682	3,253	2,601	2,601	ug/m^3	1.3E-01	ug/m^3	29.41	ug/m^3	1.5E-03	ug/m^3	Max	UCL is greater than Max
	TRANS-1,2-DICHLOROETHENE	ug/m3	8,316	10,748	9,900	9,900	ug/m^3	4.0E-01	ug/m^3	6732.00	ug/m^3	2.7E-01	ug/m^3	Max	UCL is greater than Max
	TRICHLOROETHENE	ug/m3	117,648	393,490	472,560	393,490	ug/m^3	1.8E+01	ug/m^3	327.57	ug/m^3	1.5E-02	ug/m^3	95% UCL-G	
	TRICHLOROFLUOROMETHANE (FREON 11)	ug/m3	401,176	1,316,299	1,011,600	1,011,600	ug/m^3	5.1E+01	ug/m^3	550.76	ug/m^3	2.8E-02	ug/m^3	Max	UCL is greater than Max

Statistics: Maximum Detected Value (Max); 95% UCL of Normal Data (95% UCL-N); 95% UCL of Log-transformed Data (95% UCL-T); Non-parametric (UCL-NP); 95% UCL assuming Gamma distribution (95% G-UCL).

(1) The arithmetic mean and the 95UCL were calculated including half the detection limit for the non-detects. As a result, in some cases these values are above the maximum detected.
The Shapiro-Wilk test was used to test the normality/ lognormality of all data sets at the 0.05 significance level. The UCL procedures listed were selected based on the recommendations of the ProUCL statistical program and based on the results of the W Test, the number of samples, and the standard deviation of the log-transformed data.

(2) Soil gas values modeled to provide indoor air concentrations using Karami, et al. (1987) equations along with the USEPA Draft Soil Screening Guidance (1994) to estimate ambient air concentrations from soil gas. See Appendix Tables A6-5 and A6-6.

ug/m^3: microgram per cubic meter.

ND: Not determined. Indoor air concentration could not be calculated because physical parameters for constituent were not available.

TABLE 4-24 - All Parcels, Construction Exposure
MEDIUM-SPECIFIC EXPOSURE POINT CONCENTRATION SUMMARY
Omega Chemical Site - Whittier, California

Scenario Timeframe:	Future
Medium:	Soil Gas 5 to 30 feet bgs
Exposure Medium:	Ambient Air in Excavation

Exposure Point	Chemical of Potential Concern	Units	Arithmetic Mean [1]	95% UCL of Distribution [1]	Maximum Detected Concentration	Exposure Point Concentrations									
						EPC Soil Gas Value	Units	EPC Excavation Air Value [2]	Units	Minimum Detected Value	Units	Minimum EPC Excavation Air Value [2]	Units	Statistic [3]	Rationale
Ambient Air															
	1,1,1-TRICHLOROETHANE	ug/m3	68,256	422,993	2,457,000	422,993	ug/m^3	3.8E+02	ug/m^3	142	ug/m^3	1.27E-01	ug/m^3	95% UCL-T	
	1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE	ug/m3	729,843	902,171	3,447,000	902,171	ug/m^3	ND	ug/m^3	13	ug/m^3	ND	ug/m^3	95% UCL-G assumed	
	1,1,2-TRICHLOROETHANE	ug/m3	1,073	1,339	1,420	1,339	ug/m^3	1.1E+01	ug/m^3	328	ug/m^3	2.59E+00	ug/m^3	95% UCL-G	
	1,1-DICHLOROETHANE	ug/m3	6,163	18,874	105,300	18,874	ug/m^3	2.3E+01	ug/m^3	24	ug/m^3	3.01E-02	ug/m^3	UCL-NP	
	1,1-DICHLOROETHENE	ug/m3	352,491	439,581	1,905,600	439,581	ug/m^3	ND	ug/m^3	83	ug/m^3	ND	ug/m^3	95% UCL-G assumed	
	1,2,4-TRIMETHYLBENZENE	ug/m3	1,024	1,268	33	33	ug/m^3	ND	ug/m^3	9	ug/m^3	ND	ug/m^3	Max	UCL is greater than Max
	1,2-DICHLORO-1,1,2-TRIFLUOROETHANE	ug/m3	35,444	76,525	93,750	76,525	ug/m^3	ND	ug/m^3	3,000	ug/m^3	ND	ug/m^3	95% UCL-G	
	1,2-DICHLOROETHANE	ug/m3	1,418	1,803	10,125	1,803	ug/m^3	8.9E+00	ug/m^3	32	ug/m^3	1.57E-01	ug/m^3	95% UCL-G	
	1,3-BUTADIENE	ug/m3	513	686	139	139	ug/m^3	ND	ug/m^3	3	ug/m^3	ND	ug/m^3	Max	UCL is greater than Max
	2,2,4-TRIMETHYLPENTANE	ug/m3	1,056	1,407	1,541	1,407	ug/m^3	ND	ug/m^3	5	ug/m^3	ND	ug/m^3	95% UCL-G	
	2-BUTANONE	ug/m3	563	683	174	174	ug/m^3	ND	ug/m^3	4	ug/m^3	ND	ug/m^3	Max	UCL is greater than Max
	2-PROPANOL	ug/m3	3,312	4,675	36,900	4,675	ug/m^3	ND	ug/m^3	9,840	ug/m^3	ND	ug/m^3	95% UCL-G	
	ACETALDEHYDE	ug/m3	105	No UCL	112	112	ug/m^3	ND	ug/m^3	97	ug/m^3	ND	ug/m^3	Max	UCL is greater than Max
	ACETONE	ug/m3	2,890	4,791	21,182	4,791	ug/m^3	1.3E+02	ug/m^3	15	ug/m^3	4.18E-01	ug/m^3	UCL-NP	
	BENZENE	ug/m3	699	1,232	3,828	1,232	ug/m^3	2.0E+00	ug/m^3	3	ug/m^3	4.63E-03	ug/m^3	UCL-NP	
	BROMODICHLOROMETHANE	ug/m3	1,138	1,427	24	24	ug/m^3	1.2E-01	ug/m^3	9	ug/m^3	4.53E-02	ug/m^3	Max	UCL is greater than Max
	BROMOFORM	ug/m3	1,772	2,225	13	13	ug/m^3	5.0E-02	ug/m^3	13	ug/m^3	5.04E-02	ug/m^3	Max	UCL is greater than Max
	CARBON DISULFIDE	ug/m3	2,218	2,881	26,124	2,881	ug/m^3	1.3E+00	ug/m^3	3	ug/m^3	1.41E-03	ug/m^3	95% UCL-G	
	CARBON TETRACHLORIDE	ug/m3	1,189	1,487	233	233	ug/m^3	1.8E-01	ug/m^3	126	ug/m^3	9.53E-02	ug/m^3	Max	UCL is greater than Max
	CHLOROFORM	ug/m3	4,741	5,987	107,360	5,987	ug/m^3	1.2E+01	ug/m^3	7	ug/m^3	1.42E-02	ug/m^3	95% UCL-G	
	CIS-1,2-DICHLOROETHENE	ug/m3	2,742	8,819	37,620	8,819	ug/m^3	1.5E+01	ug/m^3	51	ug/m^3	8.74E-02	ug/m^3	UCL-NP	
	CYCLOHEXANE	ug/m3	794	1,075	963	963	ug/m^3	ND	ug/m^3	4	ug/m^3	ND	ug/m^3	Max	UCL is greater than Max
	DIBROMOCHLOROMETHANE	ug/m3	1,460	1,832	14	14	ug/m^3	5.2E-02	ug/m^3	9	ug/m^3	3.60E-02	ug/m^3	Max	UCL is greater than Max
	DICHLORODIFLUOROMETHANE	ug/m3	1,124	1,393	9,405	1,393	ug/m^3	4.7E-01	ug/m^3	11	ug/m^3	3.87E-03	ug/m^3	95% UCL-G	
	ETHANOL	ug/m3	1,758	2,375	254	254	ug/m^3	ND	ug/m^3	13	ug/m^3	ND	ug/m^3	Max	UCL is greater than Max
	ETHYLBENZENE	ug/m3	785	983	30	30	ug/m^3	1.2E-01	ug/m^3	6	ug/m^3	2.26E-02	ug/m^3	Max	UCL is greater than Max
	HEPTANE	ug/m3	922	1,244	127	127	ug/m^3	ND	ug/m^3	5	ug/m^3	ND	ug/m^3	Max	UCL is greater than Max
	HEXANE (N-HEXANE)	ug/m3	864	1,144	4,576	1,144	ug/m^3	2.7E-01	ug/m^3	4	ug/m^3	9.23E-04	ug/m^3	95% UCL-G	
	M,P-XYLENES	ug/m3	988	1,210	608	608	ug/m^3	1.5E+00	ug/m^3	10	ug/m^3	2.43E-02	ug/m^3	Max	UCL is greater than Max
	METHYL TERT-BUTYL ETHER	ug/m3	912	1,500	21	21	ug/m^3	1.4E-01	ug/m^3	19	ug/m^3	1.24E-01	ug/m^3	Max	UCL is greater than Max
	METHYLENE CHLORIDE	ug/m3	1,168	1,451	23,249	1,451	ug/m^3	ND	ug/m^3	8	ug/m^3	ND	ug/m^3	95% UCL-G	
	O-XYLENE	ug/m3	817	1,523	3,472	1,523	ug/m^3	9.1E+00	ug/m^3	5	ug/m^3	2.84E-02	ug/m^3	UCL-NP	
	PENTANE	ug/m3	21,535	No UCL	21,535	21,535	ug/m^3	ND	ug/m^3	21,535	ug/m^3	ND	ug/m^3	Max	UCL is greater than Max
	TETRACHLOROETHENE	ug/m3	451,697	574,757	3,390,000	574,757	ug/m^3	5.9E+02	ug/m^3	12	ug/m^3	1.26E-02	ug/m^3	95% UCL-G	
	TETRAHYDROFURAN	ug/m3	751	1,038	3,835	1,038	ug/m^3	ND	ug/m^3	3	ug/m^3	ND	ug/m^3	95% UCL-G	

TABLE 4-24 - All Parcels, Construction Exposure
MEDIUM-SPECIFIC EXPOSURE POINT CONCENTRATION SUMMARY
Omega Chemical Site - Whittier, California

Scenario Timeframe:	Future
Medium:	Soil Gas 5 to 30 feet bgs
Exposure Medium:	Ambient Air in Excavation

Exposure Point	Chemical of Potential Concern	Units	Arithmetic Mean [1]	95% UCL of Distribution [1]	Maximum Detected Concentration	Exposure Point Concentrations									
						EPC Soil Gas Value	Units	EPC Excavation Air Value [2]	Units	Minimum Detected Value	Units	Minimum EPC Excavation Air Value [2]	Units	Statistic [3]	Rationale
	TOLUENE	ug/m3	965	1,362	15,080	1,362	ug/m^3	3.7E+00	ug/m^3	8	ug/m^3	2.06E-02	ug/m^3	95% UCL-T	
	TRANS-1,2-DICHLOROETHENE	ug/m3	3,392	4,402	24,552	4,402	ug/m^3	4.4E+00	ug/m^3	35	ug/m^3	3.52E-02	ug/m^3	95% UCL-G	
	TRICHLOROETHENE	ug/m3	69,849	87,149	472,560	87,149	ug/m^3	1.5E+02	ug/m^3	54	ug/m^3	9.31E-02	ug/m^3	95% UCL-G	
	TRICHLOROFLUOROMETHANE (FREON 11)	ug/m3	216,718	268,990	1,236,400	268,990	ug/m^3	1.7E+02	ug/m^3	6	ug/m^3	3.59E-03	ug/m^3	95% UCL-G	
	VINYL CHLORIDE	ug/m3	483	605	79	79	ug/m^3	3.2E-02	ug/m^3	33	ug/m^3	1.36E-02	ug/m^3	Max	UCL is greater than Max

Statistics: Maximum Detected Value (Max); 95% UCL of Normal Data (95% UCL-N); 95% UCL of Log-transformed Data (95% UCL-T); Non-parametric (UCL-NP); 95% UCL assuming Gamma distribution (95% G-UCL).

(1) The arithmetic mean and the 95UCL were calculated including half the detection limit for the non-detects. As a result, in some cases these values are above the maximum detected.
The Shapiro-Wilk test was used to test the normality/ lognormality of all data sets at the 0.05 significance level. The UCL procedures listed were selected based on the recommendations of the ProUCL statistical program and based on the results of the W Test, the number of samples, and the standard deviation of the log-transformed data.

(2) Soil gas values partitioned to determine a soil source concentration and then modeled to provide ambient air concentrations using RBCA Tool Kit for Chemical Releases Version 1.2. See Appendix Tables A6-7 and A6-8.

ug/m^3: microgram per cubic meter.

ND: Not determined. Indoor air concentration could not be calculated because physical parameters for constituent were not available.

TABLE 4-25 - Site Parcel, Construction Exposure
MEDIUM-SPECIFIC EXPOSURE POINT CONCENTRATION SUMMARY
Omega Chemical Site - Whittier, California

Scenario Timeframe:	Future
Medium:	Soil Gas 5 to 30 feet bgs
Exposure Medium:	Ambient Air in Excavation

Exposure Point	Chemical of Potential Concern	Units	Arithmetic Mean [1]	95% UCL of Distribution [1]	Maximum Detected Concentration	Exposure Point Concentrations									
						EPC Soil Gas Value	Units	EPC Excavation Air Value [2]	Units	Minimum Detected Value	Units	Minimum EPC Excavation Air Value [2]	Units	Statistic [3]	Rationale
Ambient Air															
	1,1,1-TRICHLOROETHANE	ug/m3	105,462	285,452	2,457,000	285,452	ug/m^3	2.5E+02	ug/m^3	197	ug/m^3	1.76E-01	ug/m^3	UCL-NP	
	1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE	ug/m3	812,823	1,002,004	2,910,800	1,002,004	ug/m^3	ND	ug/m^3	2,604	ug/m^3	ND	ug/m^3	95% UCL-G assumed	
	1,1,2-TRICHLOROETHANE	ug/m3	1,069	1,383	1,420	1,383	ug/m^3	1.1E+01	ug/m^3	328	ug/m^3	2.59E+00	ug/m^3	95% UCL-G assumed	
	1,1-DICHLOROETHANE	ug/m3	9,076	24,174	105,300	24,174	ug/m^3	3.0E+01	ug/m^3	24	ug/m^3	3.01E-02	ug/m^3	95% UCL-T	
	1,1-DICHLOROETHENE	ug/m3	426,003	538,251	1,905,600	538,251	ug/m^3	ND	ug/m^3	1,528	ug/m^3	ND	ug/m^3	95% UCL-G	
	1,2-DICHLORO-1,1,2-TRIFLUOROETHANE	ug/m3	22,430	54,098	81,250	54,098	ug/m^3	ND	ug/m^3	3,000	ug/m^3	ND	ug/m^3	95% UCL-G	
	1,2-DICHLOROETHANE	ug/m3	1,822	5,103	10,125	5,103	ug/m^3	2.5E+01	ug/m^3	32	ug/m^3	1.57E-01	ug/m^3	95% UCL-T	
	1,3-BUTADIENE	ug/m3	711	1,082	11	11	ug/m^3	ND	ug/m^3	11	ug/m^3	ND	ug/m^3	Max	UCL is greater than Max
	2,2,4-TRIMETHYLPENTANE	ug/m3	1,487	2,145	701	701	ug/m^3	ND	ug/m^3	458	ug/m^3	ND	ug/m^3	Max	UCL is greater than Max
	2-BUTANONE	ug/m3	572	717	171	171	ug/m^3	ND	ug/m^3	103	ug/m^3	ND	ug/m^3	Max	UCL is greater than Max
	ACETALDEHYDE	ug/m3	105	No UCL	112	112	ug/m^3	ND	ug/m^3	97	ug/m^3	ND	ug/m^3	Max	UCL is greater than Max
	ACETONE	ug/m3	3,715	6,471	21,182	6,471	ug/m^3	1.8E+02	ug/m^3	105	ug/m^3	2.83E+00	ug/m^3	UCL-NP	
	BENZENE	ug/m3	764	1,293	3,828	1,293	ug/m^3	2.1E+00	ug/m^3	31	ug/m^3	5.04E-02	ug/m^3	UCL-NP	
	CARBON DISULFIDE	ug/m3	3,288	4,417	26,124	4,417	ug/m^3	2.0E+00	ug/m^3	249	ug/m^3	1.13E-01	ug/m^3	95% UCL-G	
	CARBON TETRACHLORIDE	ug/m3	1,154	2,598	233	233	ug/m^3	1.8E-01	ug/m^3	126	ug/m^3	9.53E-02	ug/m^3	Max	UCL is greater than Max
	CHLOROFORM	ug/m3	5,534	6,980	48,800	6,980	ug/m^3	1.4E+01	ug/m^3	49	ug/m^3	9.46E-02	ug/m^3	95% UCL-G	
	CIS-1,2-DICHLOROETHENE	ug/m3	3,813	9,819	37,620	9,819	ug/m^3	1.7E+01	ug/m^3	51	ug/m^3	8.74E-02	ug/m^3	UCL-NP	
	CYCLOHEXANE	ug/m3	1,062	1,644	24	24	ug/m^3	ND	ug/m^3	17	ug/m^3	ND	ug/m^3	Max	UCL is greater than Max
	DICHLORODIFLUOROMETHANE	ug/m3	977	2,099	1,238	1,238	ug/m^3	4.2E-01	ug/m^3	59	ug/m^3	2.02E-02	ug/m^3	Max	UCL is greater than Max
	ETHYLBENZENE	ug/m3	770	1,745	30	30	ug/m^3	1.2E-01	ug/m^3	17	ug/m^3	6.94E-02	ug/m^3	Max	UCL is greater than Max
	HEPTANE	ug/m3	1,273	1,896	127	127	ug/m^3	ND	ug/m^3	115	ug/m^3	ND	ug/m^3	Max	UCL is greater than Max
	HEXANE (N-HEXANE)	ug/m3	1,242	1,859	4,576	1,859	ug/m^3	4.43E-01	ug/m^3	197	ug/m^3	4.70E-02	ug/m^3	95% UCL-G	
	M,P-XYLENES	ug/m3	1,087	1,747	608	608	ug/m^3	1.5E+00	ug/m^3	61	ug/m^3	1.48E-01	ug/m^3	Max	UCL is greater than Max
	METHYLENE CHLORIDE	ug/m3	1,493	2,503	23,249	2,503	ug/m^3	ND	ug/m^3	555	ug/m^3	ND	ug/m^3	95% UCL-T	
	O-XYLENE	ug/m3	824	1,829	3,472	1,829	ug/m^3	1.09E+01	ug/m^3	29	ug/m^3	1.71E-01	ug/m^3	UCL-NP	
	TETRACHLOROETHENE	ug/m3	572,704	720,351	3,390,000	720,351	ug/m^3	7.4E+02	ug/m^3	488	ug/m^3	5.02E-01	ug/m^3	95% UCL-G	
	TETRAHYDROFURAN	ug/m3	1,120	1,693	3,835	1,693	ug/m^3	ND	ug/m^3	3,835	ug/m^3	ND	ug/m^3	95% UCL-G	

TABLE 4-25 - Site Parcel, Construction Exposure
MEDIUM-SPECIFIC EXPOSURE POINT CONCENTRATION SUMMARY
Omega Chemical Site - Whittier, California

Scenario Timeframe:	Future
Medium:	Soil Gas 5 to 30 feet bgs
Exposure Medium:	Ambient Air in Excavation

Exposure Point	Chemical of Potential Concern	Units	Arithmetic Mean [1]	95% UCL of Distribution [1]	Maximum Detected Concentration	Exposure Point Concentrations									
						EPC Soil Gas Value	Units	EPC Excavation Air Value [2]	Units	Minimum Detected Value	Units	Minimum EPC Excavation Air Value [2]	Units	Statistic [3]	Rationale
	TOLUENE	ug/m3	951	1,191	15,080	1,191	ug/m^3	3.3E+00	ug/m^3	60	ug/m^3	1.65E-01	ug/m^3	95% UCL-T	
	TRANS-1,2-DICHLOROETHENE	ug/m3	4,903	6,512	24,552	6,512	ug/m^3	6.5E+00	ug/m^3	35	ug/m^3	3.52E-02	ug/m^3	95% UCL-G	
	TRICHLOROETHENE	ug/m3	87,323	108,427	451,080	108,427	ug/m^3	1.9E+02	ug/m^3	199	ug/m^3	3.45E-01	ug/m^3	95% UCL-G	
	TRICHLOROFLUOROMETHANE (FREON 11)	ug/m3	259,879	325,350	1,236,400	325,350	ug/m^3	2.1E+02	ug/m^3	1,068	ug/m^3	6.82E-01	ug/m^3	95% UCL-G assumed	
	VINYL CHLORIDE	ug/m3	468	1,056	79	79	ug/m^3	3.2E-02	ug/m^3	33	ug/m^3	1.36E-02	ug/m^3	Max	UCL is greater than Max

Statistics: Maximum Detected Value (Max); 95% UCL of Normal Data (95% UCL-N); 95% UCL of Log-transformed Data (95% UCL-T); Non-parametric (UCL-NP); 95% UCL assuming Gamma distribution (95% G-UCL).

(1) The arithmetic mean and the 95UCL were calculated including half the detection limit for the non-detects. As a result, in some cases these values are above the maximum detected.
The Shapiro-Wilk test was used to test the normality/ lognormality of all data sets at the 0.05 significance level. The UCL procedures listed were selected based on the recommendations of the ProUCL statistical program and based on the results of the W Test, the number of samples, and the standard deviation of the log-transformed data.

(2) Soil gas values partitioned to determine a soil source concentration and then modeled to provide ambient air concentrations using RBCA Tool Kit for Chemical Releases Version 1.2. See Appendix Tables A6-9 and A6-10.

ug/m^3: microgram per cubic meter.

ND: Not determined. Indoor air concentration could not be calculated because physical parameters for constituent were not available.

TABLE 4-26 - Other Parcels, Construction Exposure
MEDIUM-SPECIFIC EXPOSURE POINT CONCENTRATION SUMMARY
Omega Chemical Site - Whittier, California

Scenario Timeframe:	Future
Medium:	Soil Gas 5 to 30 feet bgs
Exposure Medium:	Ambient Air in Excavation

Exposure Point	Chemical of Potential Concern	Units	Arithmetic Mean [1]	95% UCL of Distribution [1]	Maximum Detected Concentration	Exposure Point Concentrations									
						EPC Soil Gas Value	Units	EPC Excavation Air Value [2]	Units	Minimum Detected Value	Units	Minimum EPC Excavation Air Value [2]	Units	Statistic [3]	Rationale
Ambient Air															
	1,1,1-TRICHLOROETHANE	ug/m3	8,848	64,480	251,160	64,480	ug/m^3	5.8E+01	ug/m^3	142	ug/m^3	1.27E-01	ug/m^3	UCL-NP	
	1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE	ug/m3	607,484	950,498	3,447,000	950,498	ug/m^3	ND	ug/m^3	13	ug/m^3	ND	ug/m^3	95% UCL-G	
	1,1-DICHLOROETHANE	ug/m3	1,187	1,872	8,910	1,872	ug/m^3	2.3E+00	ug/m^3	486	ug/m^3	6.03E-01	ug/m^3	95% UCL-G	
	1,1-DICHLOROETHENE	ug/m3	244,094	380,406	1,071,900	380,406	ug/m^3	ND	ug/m^3	83	ug/m^3	ND	ug/m^3	95% UCL-G	
	1,2,4-TRIMETHYLBENZENE	ug/m3	934	1,431	16	16	ug/m^3	ND	ug/m^3	9	ug/m^3	ND	ug/m^3	Max	UCL is greater than Max
	1,2-DICHLORO-1,1,2-TRIFLUOROETHANE	ug/m3	87,500	No UCL	93,750	93,750	ug/m^3	ND	ug/m^3	81,250	ug/m^3	ND	ug/m^3	Max	UCL is greater than Max
	1,3-BUTADIENE	ug/m3	415	623	139	139	ug/m^3	ND	ug/m^3	3	ug/m^3	ND	ug/m^3	Max	UCL is greater than Max
	2,2,4-TRIMETHYLPENTANE	ug/m3	849	1,275	1,541	1,275	ug/m^3	ND	ug/m^3	5	ug/m^3	ND	ug/m^3	95% UCL-G assumed	
	2-BUTANONE	ug/m3	548	791	174	174	ug/m^3	ND	ug/m^3	4	ug/m^3	ND	ug/m^3	Max	UCL is greater than Max
	2-PROPANOL	ug/m3	3,109	5,081	36,900	5,081	ug/m^3	ND	ug/m^3	9,840	ug/m^3	ND	ug/m^3	95% UCL-G	
	4-ETHYLTOLUENE	ug/m3	932	1,445	17	17	ug/m^3	ND	ug/m^3	7	ug/m^3	ND	ug/m^3	Max	UCL is greater than Max
	ACETONE	ug/m3	440	691	500	500	ug/m^3	1.4E+01	ug/m^3	15	ug/m^3	4.18E-01	ug/m^3	Max	UCL is greater than Max
	BENZENE	ug/m3	2,270	5,690	89	89	ug/m^3	1.4E-01	ug/m^3	3	ug/m^3	4.63E-03	ug/m^3	Max	UCL is greater than Max
	BROMODICHLOROMETHANE	ug/m3	1,143	2,089	24	24	ug/m^3	1.2E-01	ug/m^3	9	ug/m^3	4.53E-02	ug/m^3	Max	UCL is greater than Max
	BROMOFORM	ug/m3	1,956	3,044	13	13	ug/m^3	5.0E-02	ug/m^3	13	ug/m^3	5.04E-02	ug/m^3	Max	UCL is greater than Max
	CARBON DISULFIDE	ug/m3	601	945	26	26	ug/m^3	1.2E-02	ug/m^3	3	ug/m^3	1.41E-03	ug/m^3	Max	UCL is greater than Max
	CHLOROFORM	ug/m3	3,521	12,512	107,360	12,512	ug/m^3	2.4E+01	ug/m^3	7	ug/m^3	1.42E-02	ug/m^3	95% UCL-T	
	CIS-1,2-DICHLOROETHENE	ug/m3	1,046	1,644	13,068	1,644	ug/m^3	2.8E+00	ug/m^3	713	ug/m^3	1.21E+00	ug/m^3	95% UCL-G	
	CYCLOHEXANE	ug/m3	658	1,008	963	963	ug/m^3	ND	ug/m^3	4	ug/m^3	ND	ug/m^3	Max	UCL is greater than Max
	DIBROMOCHLOROMETHANE	ug/m3	1,646	2,581	14	14	ug/m^3	5.2E-02	ug/m^3	9	ug/m^3	3.60E-02	ug/m^3	Max	UCL is greater than Max
	DICHLORODIFLUOROMETHANE	ug/m3	1,325	2,034	9,405	2,034	ug/m^3	6.92E-01	ug/m^3	11	ug/m^3	3.87E-03	ug/m^3	95% UCL-G	
	ETHANOL	ug/m3	1,405	2,156	254	254	ug/m^3	ND	ug/m^3	13	ug/m^3	ND	ug/m^3	Max	UCL is greater than Max
	ETHYLBENZENE	ug/m3	808	1,236	20	20	ug/m^3	8.2E-02	ug/m^3	6	ug/m^3	2.26E-02	ug/m^3	Max	UCL is greater than Max
	HEPTANE	ug/m3	746	1,143	98	98	ug/m^3	ND	ug/m^3	5	ug/m^3	ND	ug/m^3	Max	UCL is greater than Max
	HEXANE (N-HEXANE)	ug/m3	679	1,000	2,218	1,000	ug/m^3	2.4E-01	ug/m^3	4	ug/m^3	9.23E-04	ug/m^3	95% UCL-G assumed	
	M,P-XYLENES	ug/m3	847	3,106	126	126	ug/m^3	3.1E-01	ug/m^3	10	ug/m^3	2.43E-02	ug/m^3	Max	UCL is greater than Max
	METHYL TERT-BUTYL ETHER	ug/m3	683	1,068	21	21	ug/m^3	1.4E-01	ug/m^3	19	ug/m^3	1.24E-01	ug/m^3	Max	UCL is greater than Max
	METHYLENE CHLORIDE	ug/m3	681	1,035	298	298	ug/m^3	ND	ug/m^3	8	ug/m^3	ND	ug/m^3	Max	UCL is greater than Max
	O-XYLENE	ug/m3	808	1,229	24	24	ug/m^3	1.4E-01	ug/m^3	5	ug/m^3	2.84E-02	ug/m^3	Max	UCL is greater than Max
	PENTANE	ug/m3	21,535	No UCL	21,535	21,535	ug/m^3	ND	ug/m^3	21,535	ug/m^3	ND	ug/m^3	Max	UCL is greater than Max
	TETRACHLOROETHENE	ug/m3	273,264	706,170	2,101,800	706,170	ug/m^3	7.3E+02	ug/m^3	12	ug/m^3	1.26E-02	ug/m^3	95% UCL-T	
	TETRAHYDROFURAN	ug/m3	570	894	4	4	ug/m^3	ND	ug/m^3	3	ug/m^3	ND	ug/m^3	Max	UCL is greater than Max

TABLE 4-26 - Other Parcels, Construction Exposure
MEDIUM-SPECIFIC EXPOSURE POINT CONCENTRATION SUMMARY
Omega Chemical Site - Whittier, California

Scenario Timeframe:	Future
Medium:	Soil Gas 5 to 30 feet bgs
Exposure Medium:	Ambient Air in Excavation

Exposure Point	Chemical of Potential Concern	Units	Arithmetic Mean [1]	95% UCL of Distribution [1]	Maximum Detected Concentration	Exposure Point Concentrations									
						EPC Soil Gas Value	Units	EPC Excavation Air Value [2]	Units	Minimum Detected Value	Units	Minimum EPC Excavation Air Value [2]	Units	Statistic [3]	Rationale
	TOLUENE	ug/m3	984	2,463	12,441	2,463	ug/m^3	6.7E+00	ug/m^3	8	ug/m^3	2.06E-02	ug/m^3	95% UCL-T	
	TRANS-1,2-DICHLOROETHENE	ug/m3	995	1,597	9,900	1,597	ug/m^3	1.6E+00	ug/m^3	673	ug/m^3	6.73E-01	ug/m^3	95% UCL-G	
	TRICHLOROETHENE	ug/m3	43,637	123,349	472,560	123,349	ug/m^3	2.1E+02	ug/m^3	54	ug/m^3	9.31E-02	ug/m^3	95% UCL-T	
	TRICHLOROFLUOROMETHANE (FREON 11)	ug/m3	153,073	237,484	1,011,600	237,484	ug/m^3	1.5E+02	ug/m^3	6	ug/m^3	3.59E-03	ug/m^3	95% UCL-G	

Statistics: Maximum Detected Value (Max); 95% UCL of Normal Data (95% UCL-N); 95% UCL of Log-transformed Data (95% UCL-T); Non-parametric (UCL-NP); 95% UCL assuming Gamma distribution (95% G-UCL).

(1) The arithmetic mean and the 95UCL were calculated including half the detection limit for the non-detects. As a result, in some cases these values are above the maximum detected.
The Shapiro-Wilk test was used to test the normality/ lognormality of all data sets at the 0.05 significance level. The UCL procedures listed were selected based on the recommendations of the ProUCL statistical program and based on the results of the W Test, the number of samples, and the standard deviation of the log-transformed data.

(2) Soil gas values partitioned to determine a soil source concentration and then modeled to provide ambient air concentrations using RBCA Tool Kit for Chemical Releases Version 1.2. See Appendix Tables A6-11 and A6-12.

ug/m^3: microgram per cubic meter.

ND: Not determined. Indoor air concentration could not be calculated because physical parameters for constituent were not available.

Section 5
Toxicity Assessment

The purpose of a toxicity assessment is to review and summarize available information on the potential for each chemical of potential concern (COPC) to cause adverse effects in exposed individuals. Adverse effects include both noncarcinogenic and carcinogenic health effects in humans. For most adverse effects caused by chemicals, a positive relationship exists between dose (intake of a chemical through a particular exposure pathway, such as ingestion) and response. Generally, as dose increases, type and severity of adverse response also increases. Further, time of onset of toxic responses often shortens.

A key facet of any toxicity assessment is the use of dose-response information to describe a quantitative relationship between human exposure and potential for adverse health effects. Quantitative toxicity criteria are generally numerical expressions developed by EPA of the relationship between chronic average daily dose (exposure) and toxic response (adverse health effects). As described below, separate toxicity criteria are developed for assessment of carcinogenic and noncarcinogenic health effects.

Sources of toxicity information included, in order of descending priority, are:

- Office of Environmental Health Hazard Assessment (CalEPA) Toxicity Criteria Database or USEPA's Integrated Risk Information System (IRIS) – The more health-protective toxicity value of CalEPA and IRIS will be used, with the exception of TCE (see Section 7).
- USEPA criteria documents
- Agency for Toxic Substances and Disease Registry (ATSDR) Toxicological Profiles

This section explains how toxicity criteria for carcinogens and noncarcinogens are developed and expressed, and summarizes toxicity values for each COPC. The general basis for the development of toxicity values for carcinogens and noncarcinogens is presented in subsections 5.1 and 5.2, respectively, along with a summary of the toxicity values for all COPCs.

5.1 Carcinogens

5.1.1 Evidence of Carcinogenicity

USEPA has developed a classification system for carcinogens, which characterizes the overall weight of evidence of carcinogenicity based on the availability of human, animal, and other supportive data. Three major factors are considered:

- The quality of evidence from human studies
- The quality of evidence from animal studies

- Other supportive data assessed to determine whether the overall weight of evidence should be modified

USEPA classification system for the characterization of the overall weight of carcinogenicity has the following five categories:

1. Human Carcinogen. This category indicates that there is sufficient evidence from epidemiological studies to support a causal association between an agent and cancer.

2. Probable Human Carcinogen. This category generally indicates that there is at least limited evidence from epidemiological studies of carcinogenicity to humans (Group B1) or that, in the absence of adequate data on humans, there is sufficient evidence of carcinogenicity in animals (Group B2).

3. Possible Human Carcinogen. This category indicates that there is limited evidence of carcinogenicity in animals in the absence of adequate data on humans.

4. Not Classified. This category indicates that the evidence for carcinogenicity in animals is inadequate.

5. Evidence of Noncarcinogenicity to Humans. This category indicates that there is evidence for noncarcinogenicity in at least two adequate animal tests in different species or in both epidemiological and animal studies.

5.1.2 Cancer Slope Factors

Carcinogenic toxicity criteria are usually provided as cancer slope factors (CSFs) in units of excess risk per milligram of chemical per kilogram of body weight per day ($(mg/kg\text{-}day)^{-1}$). These factors are based on the assumption that no threshold exists for carcinogenic effects and any dose is associated with some finite carcinogenic risk. Chemical-specific toxicity criteria for the carcinogens at the site are presented in Table 5-1.

USEPA has used a variety of specialized models to estimate the upper bound risk of carcinogenesis for a number of compounds. Data from animal or epidemiological studies are used to determine slope factors, which are expressed as $(mg/kg\text{-}day)^{-1}$ for a lifetime exposure. The CSF describes the increase in an individual's risk of developing cancer over a 70-year lifetime per unit of exposure where the unit of exposure is expressed as mg/kg-day.

CSFs are calculated using methods protective of human health and are based on the assumption that cancer risks decrease linearly with decreasing dose. The 95 percent upper confidence limit estimate for the slope is used in most cases to compensate for animal to human extrapolation and other uncertainties. The resulting CSFs are considered to be upper range estimates that are unlikely to underestimate carcinogenic potential in humans.

When the upper-bound CSF is multiplied by the lifetime average daily dose of a potential carcinogen, the product is the upper-bound lifetime individual cancer risk associated with exposure at that dose. The calculated risk is thus an estimate of the increased likelihood of cancer resulting from exposure to a chemical. For example, if the product of the CSF and the average daily dose is 1×10^{-6}, the predicted upper-bound cancer risk for the exposed population is one in one million, or 0.0001 percent. This risk is in addition to any "background" risk of cancer not related to the chemical exposure.

Calculation of risk often relies on data derived from chronic animal bioassays. The likelihood that an animal carcinogen is also a human carcinogen is a function of the following factors:

- The number of tissues affected by the chemical
- The number of animal species, strains, sexes, and number of experiments and doses showing a carcinogenic response
- The occurrence of clear-cut dose-response relationships as well as a high level of statistical significance of the increased tumor incidence in treated compared to control groups
- A dose-related decrease in time-to-tumor occurrence or time-to-death with tumor
- A dose-related increase in the proportion of malignant tumors

Animal studies are usually conducted using relatively high doses to observe adverse effects. Because humans are expected to be exposed at lower doses, data are adjusted using a mathematical model. Data from animal studies are fitted to a linearized multi-stage model and a dose-response curve is obtained. The low-dose slope of the dose-response curve is subjected to various adjustments (e.g., calculation of 95 percent UCL), and inter-species scaling factors are often applied to derive slope factors for humans. Dose-response data derived from human epidemiological studies are fitted to dose-time-response curves on an individual basis. These models provide conservative but plausible estimates of upper limits on lifetime risk. Although the actual risk is unlikely to be higher than the estimated risk, it could be considerably lower. In some instances, it may even be zero.

5.2 Noncarcinogens

Toxicity criteria for noncarcinogens, or for significant noncarcinogenic effects caused by carcinogens, are provided as reference doses (RfD) for oral and inhalation exposure and are expressed in units of milligram of chemical per kilogram of body weight per day (mg/kg-day). RfDs may be interpreted as thresholds below which adverse effects are not expected to occur in the most sensitive populations even if the exposure occurs continuously over a lifetime. Chemical-specific toxicity criteria for the noncarcinogens at the site are presented in Table 5-2.

RfDs are usually derived from no observable adverse effect levels (NOAELs) taken either from human studies, often involving workplace exposures, or from animal studies, and are adjusted downward using uncertainty or modifying factors. For example, a modifying factor of 2 to 10 may be applied if the database on a particular chemical lacks information on possible reproductive or developmental toxicity.

Uncertainty factors are generally applied to adjust for the possibility that humans are more sensitive than experimental animals and that there may be sensitive subpopulations of humans (e.g., children, pregnant women, individuals with hay fever or asthma). Depending upon the information available, other factors may also be applied.

RfDs are presented in units of mg/kg-day for comparison with estimated chronic daily intake into the body. Chronic exposure in this instance is not clearly defined, but need not be a lifetime exposure. Generally, exposures must continue for several years to be considered chronic. Intakes less than the RfD are not likely to cause adverse health effects. Chronic daily intakes greater than the RfD indicate a possibility for adverse effects. Whether such exposures actually produce adverse effects, however, is a function of a number of factors such as accuracy of uncertainty factors applied to the NOAEL, appropriateness of animal models used in studies extrapolated to humans, and potential for the chemical to cause effects in organs or systems (e.g., reproductive and immune systems) that have not been adequately studied. Generally, protective assumptions made by USEPA in deriving RfDs will, in most cases, mean that exposures slightly in excess of the RfD will be associated with a low risk for adverse effects, with the probability of adverse effects increasing with increasing exposure.

RfDs can be generated for subchronic exposures as well as chronic exposures. Subchronic is generally assumed to be exposures of several weeks to a few years. Since construction workers at the site are expected to be exposed for no more than 60 days (see Table 4-2), a subchronic reference dose is most appropriate for assessing risks to these receptors. Subchronic RfDs are derived in the same manner as RfDs for chronic exposure, except that data from shorter term animal studies, or human exposures, are used.

EPA has not published conventional quantitative toxicity criteria for lead because available data suggest a very low or possibly no threshold for adverse effects, even at exposure levels that might be considered background. Any significant increase above such background exposures could represent a cause for some concern. In lieu of evaluating risk using typical intake calculations and toxicity criteria, DTSC has developed a spreadsheet model for prediction of blood-lead levels in receptors exposed to lead from a variety of sources, including soil, dust, air, and water. Estimated blood-lead levels are compared to target blood-lead concentrations to assess possible risks. This model is further discussed in Section 6.

Inhalation toxicity values for the constituents at the site are provided in Tables 5-3 and 5-4.

5.3 Adjustment of Toxicity Values

Oral toxicity values reported in IRIS and CalEPA are based on an administered dose. Therefore, these values need to be adjusted to reflect inefficiencies that would exist through gastrointestinal absorption (EPA 2004). If oral absorption is complete, then the absorbed dose is equivalent to the administered dose and the oral value does not need to be adjusted. However, if the chemical has poor gastrointestinal absorption, then the absorbed dose is actually much smaller than the administered dose and the toxicity factor needs to be adjusted. For chemicals without a gastrointestinal absorption adjustment factor, 100 percent absorption is assumed. As the gastrointestinal absorption adjustment factor decreases, the contribution of the dermal pathway to the overall risk increases. These adjusted toxicity values are used in the calculation of risks and hazards for the dermal pathway. Gastrointestinal absorption adjustment factors for the COPCs are listed in Table 5-5.

Oral toxicity factors also need to be adjusted to represent a dermally absorbed dose to be used in the evaluation of the dermal exposure pathway. RAGS Part E guidance only provides dermal adjustment factors for semi-volatile organics. Volatile organics would tend to volatilize from the skin and exposure to this group of chemicals would better be assessed through the inhalation pathway. Although inorganics would remain in the soil and available for dermal contact, their toxicity is highly dependent on speciation and too little toxicity data is available on this group of chemicals to provide reliable dermal absorption factors. Dermal adjustment factors for the COPCs are listed in Table 5-5. RAGS Part E guidance recommends that dermal exposure to chemicals that do not have dermal absorption fractions to be addressed qualitatively in the uncertainty section, Section 7.

TABLE 5-1

CANCER TOXICITY DATA - ORAL/DERMAL

Omega Chemical Site - Whittier, California

Chemical of Potential Concern	Oral Cancer Slope Factor		Dermal Absorption Adjustment	Absorbed Cancer Slope Factor for Dermal		Weight of Evidence/ Cancer Guideline Description	Oral Cancer Slope Factor	
	Value	Units	(1)	Value	Units		Source(s)	Date(s) (MM/DD/YYYY)
1,1,1-TRICHLOROETHANE	NA	mg/kg/day^{-1}	NA	NA	mg/kg/day^{-1}	D	OEHHA	11/30/2006
1,1,2,2-TETRACHLOROETHANE	2.7E-01	mg/kg/day^{-1}	NA	NA	mg/kg/day^{-1}	C	OEHHA	11/30/2006
1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE	NA	mg/kg/day^{-1}	NA	NA	mg/kg/day^{-1}			11/30/2006
1,1,2-TRICHLOROETHANE	7.2E-02	mg/kg/day^{-1}	NA	NA	mg/kg/day^{-1}	C	OEHHA	11/30/2006
1,1-DICHLOROETHANE	5.7E-03	mg/kg/day^{-1}	NA	NA	mg/kg/day^{-1}	C	OEHHA	11/30/2006
1,1-DICHLOROETHENE	NA	mg/kg/day^{-1}	NA	NA	mg/kg/day^{-1}	C	IRIS	11/30/2006
1,2,4-TRIMETHYLBENZENE	NA	mg/kg/day^{-1}	NA	NA	mg/kg/day^{-1}			11/30/2006
1,2-DICHLORO-1,1,2-TRIFLUOROETHANE	NA	mg/kg/day^{-1}	NA	NA	mg/kg/day^{-1}			11/30/2006
1,2-DICHLOROBENZENE	NA	mg/kg/day^{-1}	NA	NA	mg/kg/day^{-1}	D	IRIS	07/24/2007
1,2-DICHLOROETHANE	9.1E-02	mg/kg/day^{-1}	NA	NA	mg/kg/day^{-1}	B2	IRIS	11/30/2006
1,3,5-TRIMETHYLBENZENE	NA	mg/kg/day^{-1}	NA	NA	mg/kg/day^{-1}			11/30/2006
1,3-BUTADIENE	6.0E-01	mg/kg/day^{-1}	NA	NA	mg/kg/day^{-1}		EPA-Region 9	10/01/2004
1,4-DICHLOROBENZENE	5.4E-03	mg/kg/day^{-1}	NA	NA	mg/kg/day^{-1}	2B	OEHHA	11/30/2006
1,4-DIOXANE	2.7E-02	mg/kg/day^{-1}	10.00	2.7E-03	mg/kg/day^{-1}	B2	OEHHA	11/30/2006
2,2,4-TRIMETHYLPENTANE	NA	mg/kg/day^{-1}	NA	NA	mg/kg/day^{-1}			11/30/2006
2-BUTANONE	NA	mg/kg/day^{-1}	NA	NA	mg/kg/day^{-1}			11/30/2006
2-METHYLNAPHTHALENE	NA	mg/kg/day^{-1}	10.00	NA	mg/kg/day^{-1}			11/30/2006
2-PROPANOL	NA	mg/kg/day^{-1}	NA	NA	mg/kg/day^{-1}			11/30/2006
4,4'-DDD	2.4E-01	mg/kg/day^{-1}	33.33	7.2E-03	mg/kg/day^{-1}	B2	OEHHA	07/24/2007
4,4'-DDE	3.4E-01	mg/kg/day^{-1}	33.33	1.0E-02	mg/kg/day^{-1}	B2	OEHHA	07/24/2007
4,4'-DDT	3.4E-01	mg/kg/day^{-1}	33.33	1.0E-02	mg/kg/day^{-1}	B2	OEHHA	07/24/2007
4-ETHYLTOLUENE	NA	mg/kg/day^{-1}	NA	NA	mg/kg/day^{-1}			11/30/2006
ACETALDEHYDE	NA	mg/kg/day^{-1}	NA	NA	mg/kg/day^{-1}			11/30/2006
ACETONE	NA	mg/kg/day^{-1}	NA	NA	mg/kg/day^{-1}			11/30/2006
ALUMINUM	NA	mg/kg/day^{-1}	NA	NA	mg/kg/day^{-1}			07/24/2007
ANTIMONY	NA	mg/kg/day^{-1}	NA	NA	mg/kg/day^{-1}			07/24/2007
BARIUM	NA	mg/kg/day^{-1}	NA	NA	mg/kg/day^{-1}	D	IRIS	07/24/2007
BENZENE	1.0E-01	mg/kg/day^{-1}	NA	NA	mg/kg/day^{-1}	A	OEHHA	11/30/2006
BENZO(A)ANTHRACENE	1.2E+00	mg/kg/day^{-1}	7.69	1.6E-01	mg/kg/day^{-1}	B2	OEHHA	11/30/2006
BENZO(A)PYRENE	1.2E+01	mg/kg/day^{-1}	7.69	1.6E+00	mg/kg/day^{-1}	B2	OEHHA	11/30/2006
BENZO(B)FLUORANTHENE	1.2E+00	mg/kg/day^{-1}	7.69	1.6E-01	mg/kg/day^{-1}	B2	OEHHA	11/30/2006
BENZYL ALCOHOL (PHENYLMETHANOL)	NA	mg/kg/day^{-1}	10.00	NA	mg/kg/day^{-1}			07/24/2007
BERYLLIUM	NA	mg/kg/day^{-1}	NA	NA	mg/kg/day^{-1}	B1	IRIS	07/24/2007
BIS(2-ETHYLHEXYL)PHTHALATE	1.4E-02	mg/kg/day^{-1}	10.00	1.4E-03	mg/kg/day^{-1}	B2	IRIS	11/30/2006
BROMODICHLOROMETHANE	1.3E-01	mg/kg/day^{-1}	NA	NA	mg/kg/day^{-1}	B2	OEHHA	11/30/2006
BROMOFORM	7.9E-03	mg/kg/day^{-1}	10.00	7.9E-04	mg/kg/day^{-1}	B2	IRIS	11/30/2006
BUTYLBENZYL PHTHALATE	NA	mg/kg/day^{-1}	10.00	NA	mg/kg/day^{-1}	C	IRIS	07/24/2007
CADMIUM	NA	mg/kg/day^{-1}	25.00	NA	mg/kg/day^{-1}			07/24/2007
CARBON DISULFIDE	NA	mg/kg/day^{-1}	NA	NA	mg/kg/day^{-1}			11/30/2006
CARBON TETRACHLORIDE	1.5E-01	mg/kg/day^{-1}	NA	NA	mg/kg/day^{-1}	B2	OEHHA	11/30/2006
CHLOROFORM	3.1E-02	mg/kg/day^{-1}	NA	NA	mg/kg/day^{-1}	B2	OEHHA	11/30/2006
CHROMIUM	NA	mg/kg/day^{-1}	NA	NA	mg/kg/day^{-1}	D	IRIS	11/30/2006
CHROMIUM III	NA	mg/kg/day^{-1}	NA	NA	mg/kg/day^{-1}	D	IRIS	07/24/2007
CHROMIUM VI	NA	mg/kg/day^{-1}	NA	NA	mg/kg/day^{-1}	A	IRIS	11/30/2006
CHRYSENE	1.2E-01	mg/kg/day^{-1}	7.69	1.6E-02	mg/kg/day^{-1}	B2	OEHHA	07/24/2007

TABLE 5-1

CANCER TOXICITY DATA - ORAL/DERMAL

Omega Chemical Site - Whittier, California

Chemical of Potential Concern	Oral Cancer Slope Factor		Dermal Absorption Adjustment	Absorbed Cancer Slope Factor for Dermal		Weight of Evidence/ Cancer Guideline Description	Oral Cancer Slope Factor	
	Value	Units	(1)	Value	Units		Source(s)	Date(s) (MM/DD/YYYY)
CIS-1,2-DICHLOROETHENE	NA	$mg/kg/day^{-1}$	NA	NA	$mg/kg/day^{-1}$	D	IRIS	11/30/2006
COBALT	NA	$mg/kg/day^{-1}$	NA	NA	$mg/kg/day^{-1}$			07/24/2007
COPPER	NA	$mg/kg/day^{-1}$	NA	NA	$mg/kg/day^{-1}$	D	IRIS	07/24/2007
CYCLOHEXANE	NA	$mg/kg/day^{-1}$	NA	NA	$mg/kg/day^{-1}$			11/30/2006
DIBROMOCHLOROMETHANE	8.4E-02	$mg/kg/day^{-1}$	NA	NA	$mg/kg/day^{-1}$	C	IRIS	04/12/2007
DICHLORODIFLUOROMETHANE	NA	$mg/kg/day^{-1}$	NA	NA	$mg/kg/day^{-1}$			11/30/2006
DIELDRIN	1.6E+01	$mg/kg/day^{-1}$	10.00	1.6E+00	$mg/kg/day^{-1}$	B2	OEHHA	11/30/2006
ETHANOL	NA	$mg/kg/day^{-1}$	NA	NA	$mg/kg/day^{-1}$			04/12/2007
ETHYLBENZENE	NA	$mg/kg/day^{-1}$	NA	NA	$mg/kg/day^{-1}$	D	IRIS	11/30/2006
FLUORANTHENE (IDRYL)	NA	$mg/kg/day^{-1}$	7.69	NA	$mg/kg/day^{-1}$	D	IRIS	07/24/2007
HEPTANE	NA	$mg/kg/day^{-1}$	NA	NA	$mg/kg/day^{-1}$	D	IRIS	11/30/2006
HEXANE (N-HEXANE)	NA	$mg/kg/day^{-1}$	NA	NA	$mg/kg/day^{-1}$			11/30/2006
IRON	NA	$mg/kg/day^{-1}$	NA	NA	$mg/kg/day^{-1}$			11/30/2006
ISOPHORONE	9.5E-04	$mg/kg/day^{-1}$	10.00	9.5E-05	$mg/kg/day^{-1}$	C	IRIS	07/24/2007
LEAD	8.5E-03	$mg/kg/day^{-1}$	NA	NA	$mg/kg/day^{-1}$	B2	OEHHA	11/30/2006
M,P-XYLENES	NA	$mg/kg/day^{-1}$	10.00	NA	$mg/kg/day^{-1}$		IRIS	02/27/2007
MANGANESE	NA	$mg/kg/day^{-1}$	NA	NA	$mg/kg/day^{-1}$	D	IRIS	07/24/2007
MERCURY	NA	$mg/kg/day^{-1}$	NA	NA	$mg/kg/day^{-1}$			07/24/2007
METHYL TERT-BUTYL ETHER	1.8E-04	$mg/kg/day^{-1}$	NA	NA	$mg/kg/day^{-1}$		OEHHA	07/24/2007
METHYLENE CHLORIDE	1.4E-02	$mg/kg/day^{-1}$	NA	NA	$mg/kg/day^{-1}$	B2	OEHHA	11/30/2006
MOLYBDENUM	NA	$mg/kg/day^{-1}$	NA	NA	$mg/kg/day^{-1}$			07/24/2007
NAPHTHALENE	NA	$mg/kg/day^{-1}$	7.69	NA	$mg/kg/day^{-1}$	C	OEHHA (2)	10/01/2004
NICKEL	NA	$mg/kg/day^{-1}$	NA	NA	$mg/kg/day^{-1}$			07/24/2007
O-XYLENE	NA	$mg/kg/day^{-1}$	10.00	NA	$mg/kg/day^{-1}$		IRIS	02/27/2007
PCB-1254 (AROCLOR 1254)	5.0E+00	$mg/kg/day^{-1}$	7.14	7.0E-01	$mg/kg/day^{-1}$	B2	OEHHA	11/30/2006
PENTANE	NA	$mg/kg/day^{-1}$	NA	NA	$mg/kg/day^{-1}$			11/30/2006
PHENANTHRENE	NA	$mg/kg/day^{-1}$	7.69	NA	$mg/kg/day^{-1}$	D	IRIS	11/30/2006
POLYCHLORINATED BI PHENYLS, TOTAL	5.0E+00	$mg/kg/day^{-1}$	7.14	7.0E-01	$mg/kg/day^{-1}$	B2	OEHHA	07/24/2007
PYRENE	NA	$mg/kg/day^{-1}$	7.69	NA	$mg/kg/day^{-1}$	D	IRIS	07/24/2007
SILVER	NA	$mg/kg/day^{-1}$	NA	NA	$mg/kg/day^{-1}$	D	IRIS	07/24/2007
TETRACHLOROETHENE	5.4E-01	$mg/kg/day^{-1}$	NA	NA	$mg/kg/day^{-1}$	2B	OEHHA	11/30/2006
TETRAHYDROFURAN	7.6E-03	$mg/kg/day^{-1}$	NA	NA	$mg/kg/day^{-1}$		EPA-Region 9	10/01/2004
THALLIUM	NA	$mg/kg/day^{-1}$	NA	NA	$mg/kg/day^{-1}$			07/24/2007
TOLUENE	NA	$mg/kg/day^{-1}$	NA	NA	$mg/kg/day^{-1}$			11/30/2006
TRANS-1,2-DICHLOROETHENE	NA	$mg/kg/day^{-1}$	NA	NA	$mg/kg/day^{-1}$			11/30/2006
TRICHLOROETHENE	1.3E-02	$mg/kg/day^{-1}$	NA	NA	$mg/kg/day^{-1}$	2A	OEHHA	11/30/2006

TABLE 5-1

CANCER TOXICITY DATA - ORAL/DERMAL

Omega Chemical Site - Whittier, California

Chemical of Potential Concern	Oral Cancer Slope Factor		Dermal Absorption Adjustment (1)	Absorbed Cancer Slope Factor for Dermal		Weight of Evidence/ Cancer Guideline Description	Oral Cancer Slope Factor	
	Value	Units		Value	Units		Source(s)	Date(s) (MM/DD/YYYY)
TRICHLOROFLUOROMETHANE (FREON 11)	NA	$mg/kg/day^{-1}$	NA	NA	$mg/kg/day^{-1}$			11/30/2006
VANADIUM	NA	$mg/kg/day^{-1}$	NA	NA	$mg/kg/day^{-1}$			07/24/2007
VINYL CHLORIDE	1.5	$mg/kg/day^{-1}$	NA	NA	$mg/kg/day^{-1}$	A	IRIS	11/30/2006
ZINC	NA	$mg/kg/day^{-1}$	NA	NA	$mg/kg/day^{-1}$	D	IRIS	07/24/2007

Footnotes:

(1) Dermal absorption adjustment is a combination of the dermal absorption fraction (ABSd) and the gastrointestinal absorption (ABSGI) as presented in Table A3-4.2. = ABSGI/ABSd so the absorbed cancer slope factor = SFo *ABSd/ABSGI

(2) OEHHA considers naphthalene to be a carcinogen by inhalation only, therefore, the oral cancer slope factor is not used in this risk assessment.

EPA-NCEA: USEPA Region III Provisional Peer Reviewed Toxicity Values for Superfund (PPRTV) (EPA 2005b).

IRIS: Integrated Risk Information System (EPA 2005a).

na: Chemical is listed, no value is available.

ne: Chemical has not been evaluated by EPA for evidence of human carcinogenicity.

ni: No information available.

$mg/kg/day^{-1}$: milligram per kilogram-day.

TABLE 5-2
NON-CANCER TOXICITY DATA - ORAL/DERMAL
Omega Chemical Site - Whittier, California

Chemical of Potential Concern	Chronic/ Subchronic	Oral RfD		Dermal Absorption Adjustment (1)	Absorbed RfD for Dermal		Primary Target Organ(s)	Combined Uncertainty/Modifying Factors	RfD:Target Organ(s)	
		Value	Units		Value	Units			Source(s)	Date(s) (MM/DD/YYYY)
1,1,1-TRICHLOROETHANE	chronic	2.8E-01	mg/kg/day	NA	NA	mg/kg/day			EPA-Region 9	10/01/2004
1,1,2,2-TETRACHLOROETHANE	chronic	6.0E-02	mg/kg/day	NA	NA	mg/kg/day			EPA-Region 9	10/01/2004
1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE	chronic	3.0E-01	mg/kg/day	NA	NA	mg/kg/day	CNS	10	IRIS	11/30/2006
1,1,2-TRICHLOROETHANE	chronic	4.0E-03	mg/kg/day	NA	NA	mg/kg/day	Clinical serum chemistry	1,000	IRIS	11/30/2006
1,1-DICHLOROETHANE	chronic	1.0E-01	mg/kg/day	NA	NA	mg/kg/day			EPA-Region 9	10/01/2004
1,1-DICHLOROETHENE	chronic	5.0E-02	mg/kg/day	NA	NA	mg/kg/day	Liver toxicity	100	IRIS	11/30/2006
1,2,4-TRIMETHYLBENZENE	chronic	5.0E-02	mg/kg/day	NA	NA	mg/kg/day			EPA-Region 9	10/01/2004
1,2-DICHLORO-1,1,2-TRIFLUOROETHANE	chronic	NA	mg/kg/day	NA	NA	mg/kg/day				11/30/2006
1,2-DICHLOROBENZENE	chronic	9.0E-02	mg/kg/day	NA	NA	mg/kg/day	No observed effects	1,000	IRIS	07/24/2007
1,2-DICHLOROETHANE	chronic	2.0E-02	mg/kg/day	NA	NA	mg/kg/day			EPA-Region 9	10/01/2004
1,3,5-TRIMETHYLBENZENE	chronic	5.0E-02	mg/kg/day	NA	NA	mg/kg/day			EPA-Region 9	10/01/2004
1,3-BUTADIENE	chronic	5.7E-03	mg/kg/day	NA	NA	mg/kg/day			EPA-Region 9	10/01/2004
1,4-DICHLOROBENZENE	chronic	3.0E-02	mg/kg/day	NA	NA	mg/kg/day			EPA-Region 9	10/01/2004
1,4-DIOXANE	chronic	NA	mg/kg/day	10.00	NA	mg/kg/day				11/30/2006
2,2,4-TRIMETHYLPENTANE	chronic	NA	mg/kg/day	NA	NA	mg/kg/day				11/30/2006
2-BUTANONE	chronic	6.0E-01	mg/kg/day	NA	NA	mg/kg/day	Dec. offspring weight	1,000	IRIS	11/30/2006
2-METHYLNAPHTHALENE	chronic	4.0E-03	mg/kg/day	10.00	4.0E-02	mg/kg/day	Pulmonary alveolar proteinosis	1,000	IRIS	11/30/2006
2-PROPANOL	chronic	NA		NA	NA	mg/kg/day				11/30/2006
4,4'-DDD	chronic	NA	mg/kg/day	33.33	NA	mg/kg/day				07/24/2007
4,4'-DDE	chronic	NA	mg/kg/day	33.33	NA	mg/kg/day				07/24/2007
4,4'-DDT	chronic	5.0E-04	mg/kg/day	33.33	1.7E-02	mg/kg/day	Liver lesions	100	IRIS	07/24/2007
4-ETHYLTOLUENE	chronic	NA	mg/kg/day	NA	NA	mg/kg/day				11/30/2006
ACETALDEHYDE	chronic	NA	mg/kg/day	NA	NA	mg/kg/day				11/30/2006
ACETONE	chronic	9.0E-01	mg/kg/day	NA	NA	mg/kg/day	Kidney	1,000	IRIS	11/30/2006
ALUMINUM	chronic	1.0E+00	mg/kg/day	NA	NA	mg/kg/day			EPA-Region 9	10/01/2004
ANTIMONY	chronic	4.0E-04	mg/kg/day	NA	NA	mg/kg/day	longevity, blood glucose and chloesterol	1,000	IRIS	07/24/2007
BARIUM	chronic	2.0E-01	mg/kg/day	NA	NA	mg/kg/day	Nephropathy	300	IRIS	07/24/2007
BENZENE	chronic	4.0E-03	mg/kg/day	NA	NA	mg/kg/day	Dec. lymphocyte count	300	IRIS	11/30/2006
BENZO(A)ANTHRACENE	chronic	NA	mg/kg/day	7.69	NA	mg/kg/day				11/30/2006
BENZO(A)PYRENE	chronic	NA	mg/kg/day	7.69	NA	mg/kg/day				11/30/2006
BENZO(B)FLUORANTHENE	chronic	NA	mg/kg/day	7.69	NA	mg/kg/day				11/30/2006
BENZYL ALCOHOL (PHENYLMETHANOL)	chronic	3.0E-01	mg/kg/day	10.00	3.0E+00	mg/kg/day			EPA-Region 9	10/01/2004
BERYLLIUM	chronic	2.0E-03	mg/kg/day	NA	NA	mg/kg/day	small intestinal lesions	300	IRIS	07/24/2007
BIS(2-ETHYLHEXYL)PHTHALATE	chronic	2.0E-02	mg/kg/day	10.00	2.0E-01	mg/kg/day	Inc. liver weight	1,000	IRIS	11/30/2006
BROMODICHLOROMETHANE	chronic	2.0E-02	mg/kg/day	NA	NA	mg/kg/day	Kidney	1,000	IRIS	11/30/2006
BROMOFORM	chronic	2.0E-02	mg/kg/day	10.00	2.0E-01	mg/kg/day	Liver lesions	1,000	IRIS	11/30/2006
BUTYLBENZYL PHTHALATE	chronic	2.0E-01	mg/kg/day	10.00	2.0E+00	mg/kg/day	inc. body wt. and liver to brain ratio	1,000	IRIS	07/24/2007
CADMIUM	chronic	1.0E-03	mg/kg/day	25.00	2.5E-02	mg/kg/day	significant proteinuria	10	IRIS	07/24/2007
CARBON DISULFIDE	chronic	1.0E-01	mg/kg/day	NA	NA	mg/kg/day	Fetal toxicity	100	IRIS	11/30/2006
CARBON TETRACHLORIDE	chronic	7.0E-04	mg/kg/day	NA	NA	mg/kg/day	Liver lesions	1,000	IRIS	11/30/2006
CHLOROFORM	chronic	1.0E-02	mg/kg/day	NA	NA	mg/kg/day	Liver	100	IRIS	11/30/2006
CHROMIUM	chronic	1.5E+00	mg/kg/day	NA	NA	mg/kg/day	None	100	IRIS	11/30/2006
CHROMIUM III	chronic	1.5E+00	mg/kg/day	NA	NA	mg/kg/day	No observed effects	1,000	IRIS	07/24/2007
CHROMIUM VI	chronic	3.0E-03	mg/kg/day	NA	NA	mg/kg/day	None	300	IRIS	11/30/2006
CHRYSENE	chronic	NA	mg/kg/day	7.69	NA	mg/kg/day				07/24/2007

TABLE 5-2
NON-CANCER TOXICITY DATA - ORAL/DERMAL
Omega Chemical Site - Whittier, California

Chemical of Potential Concern	Chronic/ Subchronic	Oral RfD		Dermal Absorption Adjustment (1)	Absorbed RfD for Dermal		Primary Target Organ(s)	Combined Uncertainty/Modifying Factors	RfD:Target Organ(s)	
		Value	Units		Value	Units			Source(s)	Date(s) (MM/DD/YYYY)
CIS-1,2-DICHLOROETHENE	chronic	1.0E-02	mg/kg/day	NA	NA	mg/kg/day			EPA-Region 9	10/01/2004
COBALT	chronic	2.0E-02	mg/kg/day	NA	NA	mg/kg/day			EPA-Region 9	10/01/2004
COPPER	chronic	4.0E-02	mg/kg/day	NA	NA	mg/kg/day			EPA-Region 9	10/01/2004
CYCLOHEXANE	chronic	1.7E+00	mg/kg/day	NA	NA	mg/kg/day			EPA-Region 9	10/01/2004
DIBROMOCHLOROMETHANE	chronic	2.0E-02	mg/kg/day	NA	NA	mg/kg/day	Liver lesions	1,000	IRIS	04/12/2007
DICHLORODIFLUOROMETHANE	chronic	2.0E-01	mg/kg/day	NA	NA	mg/kg/day	Dec. body weight	100	IRIS	11/30/2006
DIELDRIN	chronic	5.0E-05	mg/kg/day	10.00	5.0E-04	mg/kg/day	Liver	100	IRIS	11/30/2006
ETHANOL	chronic	NA	mg/kg/day	NA	NA	mg/kg/day				04/12/2007
ETHYLBENZENE	chronic	1.0E-01	mg/kg/day	NA	NA	mg/kg/day	Liver and kidney toxicity	1,000	IRIS	11/30/2006
FLUORANTHENE (IDRYL)	chronic	4.0E-02	mg/kg/day	7.69	3.1E-01	mg/kg/day	Nephropathy, inc. liver wt.	3,000	IRIS	07/24/2007
HEPTANE	chronic	NA	mg/kg/day	NA	NA	mg/kg/day				11/30/2006
HEXANE (N-HEXANE)	chronic	1.1E+01	mg/kg/day	NA	NA	mg/kg/day			EPA-Region 9	10/01/2004
IRON	chronic	3.0E-01	mg/kg/day	NA	NA	mg/kg/day			EPA-Region 9	10/01/2004
ISOPHORONE	chronic	2.0E-01	mg/kg/day	10.00	2.0E+00	mg/kg/day	No observed effects	1,000	IRIS	07/24/2007
LEAD	chronic	NA	mg/kg/day	NA	NA	mg/kg/day				11/30/2006
M,P-XYLENES	chronic	2.0E-01	mg/kg/day	10.00	2.0E+00	mg/kg/day	Dec. body weight, inc. mortality	1,000	IRIS	02/27/2007
MANGANESE	chronic	1.4E-01	mg/kg/day	NA	NA	mg/kg/day	CNS	1	IRIS	07/24/2007
MERCURY	chronic	3.0E-04	mg/kg/day	NA	NA	mg/kg/day			EPA-Region 9	10/01/2004
METHYL TERT-BUTYL ETHER	chronic	8.6E-01	mg/kg/day	NA	NA	mg/kg/day			EPA-Region 9	10/01/2004
METHYLENE CHLORIDE	chronic	6.0E-02	mg/kg/day	NA	NA	mg/kg/day			IRIS	11/30/2006
MOLYBDENUM	chronic	5.0E-03	mg/kg/day	NA	NA	mg/kg/day	Inc. uric acid levels	30	IRIS	07/24/2007
NAPHTHALENE	chronic	2.0E-02	mg/kg/day	7.69	1.5E-01	mg/kg/day	Dec. body weight in males	3,000	IRIS	11/30/2006
NICKEL	chronic	2.0E-02	mg/kg/day	NA	NA	mg/kg/day	dec. body and organ wts.	300	IRIS	07/24/2007
O-XYLENE	chronic	2.0E-01	mg/kg/day	10.00	2.0E+00	mg/kg/day	Dec. body weight, inc. mortality	1,000	IRIS	02/27/2007
PCB-1254 (AROCLOR 1254)	chronic	2.0E-05	mg/kg/day	7.14	1.4E-04	mg/kg/day	Ocular exudate	300	IRIS	11/30/2006
PENTANE	chronic	NA	mg/kg/day	NA	NA	mg/kg/day				11/30/2006
PHENANTHRENE	chronic	NA	mg/kg/day	7.69	NA	mg/kg/day				11/30/2006
POLYCHLORINATED BI PHENYLS, TOTAL	chronic	7.0E-05	mg/kg/day	7.14	5.0E-04	mg/kg/day			EPA-Region 9	10/01/2004
PYRENE	chronic	3.0E-02	mg/kg/day	7.69	2.3E-01	mg/kg/day	Kidney	3,000	IRIS	07/24/2007
SILVER	chronic	5.0E-03	mg/kg/day	NA	NA	mg/kg/day	Argyria	3	IRIS	07/24/2007
TETRACHLOROETHENE	chronic	1.0E-02	mg/kg/day	NA	NA	mg/kg/day	Liver toxicity in mice	1,000	IRIS	11/30/2006
TETRAHYDROFURAN	chronic	2.1E-01	mg/kg/day	NA	NA	mg/kg/day			EPA-Region 9	10/01/2004
THALLIUM	chronic	6.6E-05	mg/kg/day	NA	NA	mg/kg/day			EPA-Region 9	10/01/2004
TOLUENE	chronic	8.0E-02	mg/kg/day	NA	NA	mg/kg/day	Inc. kidney weight	3,000	IRIS	11/30/2006
TRANS-1,2-DICHLOROETHENE	chronic	2.0E-02	mg/kg/day	NA	NA	mg/kg/day	Inc. serum alkaline phosphatase in male mice	1,000	IRIS	11/30/2006
TRICHLOROETHENE	chronic	3.0E-04	mg/kg/day	NA	NA	mg/kg/day			EPA-Region 9	10/01/2004
TRICHLOROFLUOROMETHANE (FREON 11)	chronic	3.0E-01	mg/kg/day	NA	NA	mg/kg/day	Survival and histopathology	1,000	IRIS	11/30/2006
VANADIUM	chronic	1.0E-03	mg/kg/day	NA	NA	mg/kg/day			EPA-Region 9	10/01/2004
VINYL CHLORIDE	chronic	3.0E-03	mg/kg/day	NA	NA	mg/kg/day	Liver	30	IRIS	11/30/2006
ZINC	chronic	3.0E-01	mg/kg/day	NA	NA	mg/kg/day	Dec. euythrocyte Cu	3	IRIS	07/24/2007

Footnotes:

(1) Dermal absorption adjustment is a combination of the dermal absorption fraction (ABSd) and the gastrointestinal absorption (ABSGI) as presented in Table A3-4.2. = ABSGI/ABSd

so the absorbed reference dose = RfDo *ABSGI/ABSd

EPA-NCEA: USEPA Region III Provisional Peer Reviewed Toxicity Values for Superfund (PPRTV) (EPA 2005b).

HEAST: Healht Effects Assessments Summary Tables (EPA 1997b).

IRIS: Integrated Risk Information System (EPA 2005a).

na: Chemical is listed, no value is available.

ni: No information available.

nl: Chemical is not listed.

CNS: Central Nervous System.

mg/kg/day: milligram per kilogram per day.

TABLE 5-3

CANCER TOXICITY DATA - INHALATION

Omega Chemical Site - Whittier, California

Chemical of Potential Concern	Unit Risk		Inhalation Cancer Slope Factor		Weight of Evidence/ Cancer Guideline Description	Unit Risk : Inhalation CSF	
	Value	Units	Value	Units		Source(s)	Date(s) (MM/DD/YYYY)
1,1,1-TRICHLOROETHANE	NA	$(ug/m^3)^{-1}$	NA	$mg/kg/day^{-1}$	D	IRIS	11/30/2006
1,1,2,2-TETRACHLOROETHANE	5.8E-05	$(ug/m^3)^{-1}$	2.0E-01	$mg/kg/day^{-1}$	C	OEHHA	11/30/2006
1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE	NA	$(ug/m^3)^{-1}$	NA	$mg/kg/day^{-1}$			11/30/2006
1,1,2-TRICHLOROETHANE	1.6E-05	$(ug/m^3)^{-1}$	5.70E-02	$mg/kg/day^{-1}$	C	OEHHA	11/30/2006
1,1-DICHLOROETHANE	1.6E-06	$(ug/m^3)^{-1}$	5.70E-03	$mg/kg/day^{-1}$	C	OEHHA	11/30/2006
1,1-DICHLOROETHENE	NA	$(ug/m^3)^{-1}$	NA	$mg/kg/day^{-1}$	C	IRIS	11/30/2006
1,2,4-TRIMETHYLBENZENE	NA	$(ug/m^3)^{-1}$	NA	$mg/kg/day^{-1}$			11/30/2006
1,2-DICHLORO-1,1,2-TRIFLUOROETHANE	NA	$(ug/m^3)^{-1}$	NA	$mg/kg/day^{-1}$			11/30/2006
1,2-DICHLOROBENZENE	NA	$(ug/m^3)^{-1}$	NA	$mg/kg/day^{-1}$	D	IRIS	07/24/2007
1,2-DICHLOROETHANE	2.6E-05	$(ug/m^3)^{-1}$	9.1E-02	$mg/kg/day^{-1}$	B2	IRIS	11/30/2006
1,3,5-TRIMETHYLBENZENE	NA	$(ug/m^3)^{-1}$	NA	$mg/kg/day^{-1}$			11/30/2006
1,3-BUTADIENE	1.7E-04	$(ug/m^3)^{-1}$	6.0E-01	$mg/kg/day^{-1}$		EPA-Region 9	10/01/2004
1,4-DICHLOROBENZENE	1.1E-05	$(ug/m^3)^{-1}$	4.0E-02	$mg/kg/day^{-1}$	2B	OEHHA	11/30/2006
1,4-DIOXANE	7.7E-06	$(ug/m^3)^{-1}$	2.7E-02	$mg/kg/day^{-1}$	B2	OEHHA	11/30/2006
2,2,4-TRIMETHYLPENTANE	NA	$(ug/m^3)^{-1}$	NA	$mg/kg/day^{-1}$			11/30/2006
2-BUTANONE	NA	$(ug/m^3)^{-1}$	NA	$mg/kg/day^{-1}$			11/30/2006
2-METHYLNAPHTHALENE	NA	$(ug/m^3)^{-1}$	NA	$mg/kg/day^{-1}$			11/30/2006
2-PROPANOL	NA	$(ug/m^3)^{-1}$	NA	$mg/kg/day^{-1}$			11/30/2006
4,4'-DDD	6.9E-05	$(ug/m^3)^{-1}$	2.4E-01	$mg/kg/day^{-1}$	B2	OEHHA	07/24/2007
4,4'-DDE	9.7E-05	$(ug/m^3)^{-1}$	3.4E-01	$mg/kg/day^{-1}$	B2	OEHHA	07/24/2007
4,4'-DDT	9.7E-05	$(ug/m^3)^{-1}$	3.4E-01	$mg/kg/day^{-1}$	B2	OEHHA	07/24/2007
4-ETHYLTOLUENE	NA	$(ug/m^3)^{-1}$	NA	$mg/kg/day^{-1}$			11/30/2006
ACETALDEHYDE	2.7E-06	$(ug/m^3)^{-1}$	1.00E-02	$mg/kg/day^{-1}$	B2	OEHHA	11/30/2006
ACETONE	NA	$(ug/m^3)^{-1}$	NA	$mg/kg/day^{-1}$			11/30/2006
ALUMINUM	NA	$(ug/m^3)^{-1}$	NA	$mg/kg/day^{-1}$			07/24/2007
ANTIMONY	NA	$(ug/m^3)^{-1}$	NA	$mg/kg/day^{-1}$			07/24/2007
BARIUM	NA	$(ug/m^3)^{-1}$	NA	$mg/kg/day^{-1}$	D	IRIS	07/24/2007
BENZENE	2.9E-05	$(ug/m^3)^{-1}$	1.0E-01	$mg/kg/day^{-1}$	A	OEHHA	11/30/2006
BENZO(A)ANTHRACENE	1.1E-04	$(ug/m^3)^{-1}$	3.9E-01	$mg/kg/day^{-1}$	B2	OEHHA	11/30/2006
BENZO(A)PYRENE	1.1E-03	$(ug/m^3)^{-1}$	3.9E+00	$mg/kg/day^{-1}$	B2	OEHHA	11/30/2006
BENZO(B)FLUORANTHENE	1.1E-04	$(ug/m^3)^{-1}$	3.9E-01	$mg/kg/day^{-1}$	B2	OEHHA	11/30/2006
BENZYL ALCOHOL (PHENYLMETHANOL)	NA	$(ug/m^3)^{-1}$	NA	$mg/kg/day^{-1}$			07/24/2007
BERYLLIUM	2.4E-03	$(ug/m^3)^{-1}$	8.4E+00	$mg/kg/day^{-1}$	B1	IRIS	07/24/2007
BIS(2-ETHYLHEXYL)PHTHALATE	2.4E-06	$(ug/m^3)^{-1}$	8.4E-03	$mg/kg/day^{-1}$	B2	OEHHA	11/30/2006
BROMODICHLOROMETHANE	3.7E-05	$(ug/m^3)^{-1}$	1.3E-01	$mg/kg/day^{-1}$	B2	OEHHA	11/30/2006
BROMOFORM	1.1E-06	$(ug/m^3)^{-1}$	3.9E-03	$mg/kg/day^{-1}$	B2	IRIS	11/30/2006
BUTYLBENZYL PHTHALATE	NA	$(ug/m^3)^{-1}$	NA	$mg/kg/day^{-1}$	C	IRIS	07/24/2007
CADMIUM	4.2E-03	$(ug/m^3)^{-1}$	1.5E+01	$mg/kg/day^{-1}$	B1	OEHHA	07/24/2007
CARBON DISULFIDE	NA	$(ug/m^3)^{-1}$	NA	$mg/kg/day^{-1}$			11/30/2006
CARBON TETRACHLORIDE	4.3E-05	$(ug/m^3)^{-1}$	1.5E-01	$mg/kg/day^{-1}$	B2	OEHHA	11/30/2006
CHLOROFORM	2.3E-05	$(ug/m^3)^{-1}$	8.1E-02	$mg/kg/day^{-1}$	B2	IRIS	11/30/2006
CHROMIUM	NA	$(ug/m^3)^{-1}$	NA	$mg/kg/day^{-1}$	D	IRIS	11/30/2006
CHROMIUM III	NA	$(ug/m^3)^{-1}$	NA	$mg/kg/day^{-1}$	D	IRIS	07/24/2007
CHROMIUM VI	1.5E-01	$(ug/m^3)^{-1}$	5.1E+02	$mg/kg/day^{-1}$	A	OEHHA	11/30/2006
CHRYSENE	1.1E-05	$(ug/m^3)^{-1}$	3.9E-02	$mg/kg/day^{-1}$	B2	OEHHA	07/24/2007
CIS-1,2-DICHLOROETHENE	NA	$(ug/m^3)^{-1}$	NA	$mg/kg/day^{-1}$	D	IRIS	11/30/2006
COBALT	2.8E-03	$(ug/m^3)^{-1}$	9.8E+00	$mg/kg/day^{-1}$		EPA-Region 9	07/24/2007
COPPER	NA	$(ug/m^3)^{-1}$	NA	$mg/kg/day^{-1}$	D	IRIS	07/24/2007
CYCLOHEXANE	NA	$(ug/m^3)^{-1}$	NA	$mg/kg/day^{-1}$			11/30/2006
DIBROMOCHLOROMETHANE	2.7E-05	$(ug/m^3)^{-1}$	9.4E-02	$mg/kg/day^{-1}$	C	OEHHA	04/12/2007
DICHLORODIFLUOROMETHANE	NA	$(ug/m^3)^{-1}$	NA	$mg/kg/day^{-1}$			11/30/2006
DIELDRIN	4.6E-03	$(ug/m^3)^{-1}$	1.6E+01	$mg/kg/day^{-1}$	B2	OEHHA	11/30/2006

TABLE 5-3

CANCER TOXICITY DATA - INHALATION

Omega Chemical Site - Whittier, California

Chemical of Potential Concern	Unit Risk		Inhalation Cancer Slope Factor		Weight of Evidence/ Cancer Guideline Description	Unit Risk : Inhalation CSF	
	Value	Units	Value	Units		Source(s)	Date(s) (MM/DD/YYYY)
ETHANOL	NA	$(ug/m^3)^{-1}$	NA	$mg/kg/day^{-1}$			04/12/2007
ETHYLBENZENE	NA	$(ug/m^3)^{-1}$	NA	$mg/kg/day^{-1}$	D	IRIS	11/30/2006
FLUORANTHENE (IDRYL)	NA	$(ug/m^3)^{-1}$	NA	$mg/kg/day^{-1}$	D	IRIS	07/24/2007
HEPTANE	NA	$(ug/m^3)^{-1}$	NA	$mg/kg/day^{-1}$	D	IRIS	11/30/2006
HEXANE (N-HEXANE)	NA	$(ug/m^3)^{-1}$	NA	$mg/kg/day^{-1}$			11/30/2006
IRON	NA	$(ug/m^3)^{-1}$	NA	$mg/kg/day^{-1}$			11/30/2006
ISOPHORONE	2.7E-07	$(ug/m^3)^{-1}$	9.5E-04	$mg/kg/day^{-1}$	C	EPA-Region 9	07/24/2007
LEAD	1.2E-05	$(ug/m^3)^{-1}$	4.2E-02	$mg/kg/day^{-1}$	B2	OEHHA	11/30/2006
M,P-XYLENES	NA	$(ug/m^3)^{-1}$	NA	$mg/kg/day^{-1}$		IRIS	02/27/2007
MANGANESE	NA	$(ug/m^3)^{-1}$	NA	$mg/kg/day^{-1}$	D	IRIS	07/24/2007
MERCURY	NA	$(ug/m^3)^{-1}$	NA	$mg/kg/day^{-1}$			07/24/2007
METHYL TERT-BUTYL ETHER	2.6E-07	$(ug/m^3)^{-1}$	9.1E-04	$mg/kg/day^{-1}$		OEHHA	07/24/2007
METHYLENE CHLORIDE	1.0E-06	$(ug/m^3)^{-1}$	3.5E-03	$mg/kg/day^{-1}$	B2	OEHHA	11/30/2006
MOLYBDENUM	NA	$(ug/m^3)^{-1}$	NA	$mg/kg/day^{-1}$			07/24/2007
NAPHTHALENE	3.4E-05	$(ug/m^3)^{-1}$	1.2E-01	$mg/kg/day^{-1}$	C	OEHHA	11/30/2006
NICKEL	2.6E-04	$(ug/m^3)^{-1}$	9.1E-01	$mg/kg/day^{-1}$	A	OEHHA	07/24/2007
O-XYLENE	NA	$(ug/m^3)^{-1}$	NA	$mg/kg/day^{-1}$		IRIS	02/27/2007
PCB-1254 (AROCLOR 1254)	5.7E-04	$(ug/m^3)^{-1}$	2.0E+00	$mg/kg/day^{-1}$	B2	IRIS	11/30/2006
PENTANE	NA	$(ug/m^3)^{-1}$	NA	$mg/kg/day^{-1}$			11/30/2006
PHENANTHRENE	NA	$(ug/m^3)^{-1}$	NA	$mg/kg/day^{-1}$	D	IRIS	11/30/2006
POLYCHLORINATED BI PHENYLS, TOTAL	5.7E-04	$(ug/m^3)^{-1}$	2.0E+00	$mg/kg/day^{-1}$	B2	IRIS	07/24/2007
PYRENE	NA	$(ug/m^3)^{-1}$	NA	$mg/kg/day^{-1}$	D	IRIS	07/24/2007
SILVER	NA	$(ug/m^3)^{-1}$	NA	$mg/kg/day^{-1}$	D	IRIS	07/24/2007
TETRACHLOROETHENE	5.9E-06	$(ug/m^3)^{-1}$	2.1E-02	$mg/kg/day^{-1}$	2B	OEHHA	11/30/2006
TETRAHYDROFURAN	1.9E-06	$(ug/m^3)^{-1}$	6.8E-03	$mg/kg/day^{-1}$		EPA-Region 9	10/01/2004
THALLIUM	NA	$(ug/m^3)^{-1}$	NA	$mg/kg/day^{-1}$			07/24/2007
TOLUENE	NA	$(ug/m^3)^{-1}$	NA	$mg/kg/day^{-1}$			11/30/2006
TRANS-1,2-DICHLOROETHENE	NA	$(ug/m^3)^{-1}$	NA	$mg/kg/day^{-1}$			11/30/2006
TRICHLOROETHENE	2.0E-06	$(ug/m^3)^{-1}$	7.0E-03	$mg/kg/day^{-1}$	2A	OEHHA	11/30/2006
TRICHLOROFLUOROMETHANE (FREON 11)	NA	$(ug/m^3)^{-1}$	NA	$mg/kg/day^{-1}$			11/30/2006
VANADIUM	NA	$(ug/m^3)^{-1}$	NA	$mg/kg/day^{-1}$			07/24/2007
VINYL CHLORIDE	7.8E-05	$(ug/m^3)^{-1}$	2.7E-01	$mg/kg/day^{-1}$	A	OEHHA	11/30/2006
ZINC	NA	$(ug/m^3)^{-1}$	NA	$mg/kg/day^{-1}$	D	IRIS	07/24/2007

Footnotes:

Cal-EPA: Technical Support Document for Describing Available Cancer Potency Factors (OEHHA 2003).

EPA-NCEA: USEPA Region III Provisional Peer Reviewed Toxicity Values for Superfund (PPRTV) (EPA 2005b).

IRIS: Integrated Risk Information System (EPA 2005a).

na: Chemical is listed, no value is available.

ne: Chemical has not been evaluated by EPA for evidence of human carcinogenicity.

ni: No information available.

$(ug/m^3)^{-1}$: cubic meter per microgram

$mg/kg/day^{-1}$: milligram per kilogram-day.

TABLE 5-4

NON-CANCER TOXICITY DATA - INHALATION

Omega Chemical Site - Whittier, California

Chemical of Potential Concern	Chronic/ Subchronic	Inhalation RfC		Inhalation RfD		Primary Target Organ(s)	Combined Uncertainty/Modifying Factors	RfC : Target Organ(s)	
		Value	Units	Value	Units			Source(s)	Date(s) (MM/DD/YYYY)
1,1,1-TRICHLOROETHANE	chronic	2.2E+00	mg/m^3	6.3E-01	mg/kg/day			EPA-Region 9	10/01/2004
1,1,2,2-TETRACHLOROETHANE	chronic	2.1E-01	mg/m^3	6.0E-02	mg/kg/day			EPA-Region 9	10/01/2004
1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE	chronic	NA	mg/m^3	NA	mg/kg/day				11/30/2006
1,1,2-TRICHLOROETHANE	chronic	1.4E-02	mg/m^3	4.0E-03	mg/kg/day			EPA-Region 9	10/01/2004
1,1-DICHLOROETHANE	chronic	5.0E-01	mg/m^3	1.4E-01	mg/kg/day			EPA-Region 9	10/01/2004
1,1-DICHLOROETHENE	chronic	2.0E-01	mg/m^3	5.7E-02	mg/kg/day	Liver toxicity	30	IRIS	11/30/2006
1,2,4-TRIMETHYLBENZENE	chronic	6.0E-03	mg/m^3	1.7E-03	mg/kg/day			EPA-Region 9	10/01/2004
1,2-DICHLORO-1,1,2-TRIFLUOROETHANE	chronic	NA	mg/m^3	NA	mg/kg/day				11/30/2006
1,2-DICHLOROBENZENE	chronic	2.0E-01	mg/m^3	5.7E-02	mg/kg/day			EPA-Region 9	07/24/2007
1,2-DICHLOROETHANE	chronic	4.9E-03	mg/m^3	1.4E-03	mg/kg/day			EPA-Region 9	10/01/2004
1,3,5-TRIMETHYLBENZENE	chronic	6.0E-03	mg/m^3	1.7E-03	mg/kg/day			EPA-Region 9	10/01/2004
1,3-BUTADIENE	chronic	2.0E-02	mg/m^3	5.7E-03	mg/kg/day			EPA-Region 9	10/01/2004
1,4-DICHLOROBENZENE	chronic	8.0E-01	mg/m^3	2.3E-01	mg/kg/day	CNS, RESP, liver, kidney	100	OEHHA	11/30/2006
1,4-DIOXANE	chronic	3.0E+00	mg/m^3	8.6E-01	mg/kg/day	ALIM, Kidney, CVS		OEHHA	11/30/2006
2,2,4-TRIMETHYLPENTANE	chronic	NA	mg/m^3	NA	mg/kg/day				11/30/2006
2-BUTANONE	chronic	5.0E+00	mg/m^3	1.4E+00	mg/kg/day	DEV	300	IRIS	11/30/2006
2-METHYLNAPHTHALENE	chronic	NA	mg/m^3	NA	mg/kg/day				11/30/2006
2-PROPANOL	chronic	NA	mg/m^3	NA	mg/kg/day				11/30/2006
4,4'-DDD	chronic	NA	mg/m^3	NA	mg/kg/day				07/24/2007
4,4'-DDE	chronic	NA	mg/m^3	NA	mg/kg/day				07/24/2007
4,4'-DDT	chronic	1.8E-03	mg/m^3	5.0E-04	mg/kg/day			EPA-Region 9	10/01/2004
4-ETHYLTOLUENE	chronic	NA	mg/m^3	NA	mg/kg/day				11/30/2006
ACETALDEHYDE	chronic	9.0E-03	mg/m^3	2.6E-03	mg/kg/day	RESP	1E+03	OEHHA	11/30/2006
ACETONE	chronic	3.2E+00	mg/m^3	9.0E-01	mg/kg/day			EPA-Region 9	10/01/2004
ALUMINUM	chronic	4.9E-03	mg/m^3	1.4E-03	mg/kg/day			EPA-Region 9	10/01/2004
ANTIMONY	chronic	NA	mg/m^3	NA	mg/kg/day				07/24/2007
BARIUM	chronic	5.0E-04	mg/m^3	1.4E-04	mg/kg/day			EPA-Region 9	10/01/2004
BENZENE	chronic	3.0E-02	mg/m^3	8.6E-03	mg/kg/day	Hematopoetic system, DEV, CNS,	300	IRIS	11/30/2006
BENZO(A)ANTHRACENE	chronic	NA	mg/m^3	NA	mg/kg/day				11/30/2006
BENZO(A)PYRENE	chronic	NA	mg/m^3	NA	mg/kg/day				11/30/2006
BENZO(B)FLUORANTHENE	chronic	NA	mg/m^3	NA	mg/kg/day				11/30/2006
BENZYL ALCOHOL (PHENYLMETHANOL)	chronic	1.1E+00	mg/m^3	3.0E-01	mg/kg/day			EPA-Region 9	10/01/2004
BERYLLIUM	chronic	2.0E-05	mg/m^3	5.7E-06	mg/kg/day	Beryllium sensitization to CBD	10	IRIS	07/24/2007
BIS(2-ETHYLHEXYL)PHTHALATE	chronic	7.0E-02	mg/m^3	2.0E-02	mg/kg/day			EPA-Region 9	10/01/2004
BROMODICHLOROMETHANE	chronic	7.0E-02	mg/m^3	2.0E-02	mg/kg/day			EPA-Region 9	10/01/2004
BROMOFORM	chronic	7.0E-02	mg/m^3	2.0E-02	mg/kg/day			EPA-Region 9	10/01/2004
BUTYLBENZYL PHTHALATE	chronic	7.0E-01	mg/m^3	2.0E-01	mg/kg/day			EPA-Region 9	10/01/2004
CADMIUM	chronic	NA	mg/m^3	NA	mg/kg/day				07/24/2007
CARBON DISULFIDE	chronic	7.0E-01	mg/m^3	2.0E-01	mg/kg/day	Peripheral nervous system	30	IRIS	11/30/2006
CARBON TETRACHLORIDE	chronic	4.0E-02	mg/m^3	1.1E-02	mg/kg/day	ALIM, DEV, CNS		OEHHA	11/30/2006
CHLOROFORM	chronic	3.0E-01	mg/m^3	8.6E-02	mg/kg/day	ALIM, Kidney, DEV		OEHHA	11/30/2006
CHROMIUM	chronic	NA	mg/m^3	NA	mg/kg/day				11/30/2006
CHROMIUM III	chronic	NA	mg/m^3	NA	mg/kg/day				07/24/2007
CHROMIUM VI	chronic	8.0E-06	mg/m^3	2.3E-06	mg/kg/day	RESP	90	IRIS	11/30/2006
CHRYSENE	chronic	NA	mg/m^3	NA	mg/kg/day				07/24/2007
CIS-1,2-DICHLOROETHENE	chronic	3.5E-02	mg/m^3	1.0E-02	mg/kg/day			EPA-Region 9	10/01/2004
COBALT	chronic	2.0E-05	mg/m^3	5.7E-06	mg/kg/day			EPA-Region 9	10/01/2004
COPPER	chronic	NA	mg/m^3	NA	mg/kg/day				07/24/2007

TABLE 5-4

NON-CANCER TOXICITY DATA - INHALATION

Omega Chemical Site - Whittier, California

Chemical of Potential Concern	Chronic/ Subchronic	Inhalation RfC		Inhalation RfD		Primary Target Organ(s)	Combined Uncertainty/Modifying Factors	RfC : Target Organ(s)	
		Value	Units	Value	Units			Source(s)	Date(s) (MM/DD/YYYY)
CYCLOHEXANE	chronic	6.0E+00	mg/m^3	1.7E+00	mg/kg/day	Dec. offspring weight	3E+02	IRIS	11/30/2006
DIBROMOCHLOROMETHANE	chronic	7.0E-02	mg/m^3	2.0E-02	mg/kg/day			EPA-Region 9	10/01/2004
DICHLORODIFLUOROMETHANE	chronic	2.0E-01	mg/m^3	5.7E-02	mg/kg/day			EPA-Region 9	10/01/2004
DIELDRIN	chronic	1.8E-04	mg/m^3	5.0E-05	mg/kg/day			EPA-Region 9	10/01/2004
ETHANOL	chronic	NA	mg/m^3	NA	mg/kg/day				04/13/2007
ETHYLBENZENE	chronic	1.0E+00	mg/m^3	2.9E-01	mg/kg/day	DEV, ALIM, liver, kidney, endocrine	300	IRIS	11/30/2006
FLUORANTHENE (IDRYL)	chronic	1.4E-01	mg/m^3	4.0E-02	mg/kg/day			EPA-Region 9	10/01/2004
HEPTANE	chronic	NA	mg/m^3	NA	mg/kg/day				11/30/2006
HEXANE (N-HEXANE)	chronic	7.0E-01	mg/m^3	2.0E-01	mg/kg/day	Peripheral neuropathy	300	IRIS	11/30/2006
IRON	chronic	NA	mg/m^3	NA	mg/kg/day				11/30/2006
ISOPHORONE	chronic	2.0E+00	mg/m^3	5.7E-01	mg/kg/day	development, liver		OEHHA	07/24/2007
LEAD	chronic	NA	mg/m^3	NA	mg/kg/day				11/30/2006
M,P-XYLENES	chronic	1.0E-01	mg/m^3	2.9E-02	mg/kg/day	nervous system, RESP		IRIS	06/20/2007
MANGANESE	chronic	5.0E-05	mg/m^3	1.4E-05	mg/kg/day	impair neorobehavioral function	1000	IRIS	07/24/2007
MERCURY	chronic	9.0E-06	mg/m^3	2.6E-06	mg/kg/day	nervous system		OEHHA	07/24/2007
METHYL TERT-BUTYL ETHER	chronic	3.0E+00	mg/m^3	8.6E-01	mg/kg/day	inc. liver and kidney wt., renal	100	IRIS	07/24/2007
METHYLENE CHLORIDE	chronic	4.0E-01	mg/m^3	1.1E-01	mg/kg/day	CVS, CNS		OEHHA	11/30/2006
MOLYBDENUM	chronic	NA	mg/m^3	NA	mg/kg/day				07/24/2007
NAPHTHALENE	chronic	3.0E-03	mg/m^3	8.5E-04	mg/kg/day	RESP	3000	IRIS	11/30/2006
NICKEL	chronic	NA	mg/m^3	NA	mg/kg/day				07/24/2007
O-XYLENE	chronic	1.0E-01	mg/m^3	2.9E-02	mg/kg/day	nervous system, RESP		IRIS	06/20/2007
PCB-1254 (AROCLOR 1254)	chronic	7.0E-05	mg/m^3	2.0E-05	mg/kg/day			EPA-Region 9	10/01/2004
PENTANE	chronic	NA	mg/m^3	NA	mg/kg/day				11/30/2006
PHENANTHRENE	chronic	NA	mg/m^3	NA	mg/kg/day				11/30/2006
POLYCHLORINATED BI PHENYLS, TOTAL	chronic	2.5E-04	mg/m^3	7.0E-05	mg/kg/day			EPA-Region 9	10/01/2004
PYRENE	chronic	1.1E-01	mg/m^3	3.0E-02	mg/kg/day			EPA-Region 9	10/01/2004
SILVER	chronic	NA	mg/m^3	NA	mg/kg/day				07/24/2007
TETRACHLOROETHENE	chronic	3.5E-02	mg/m^3	1.0E-02	mg/kg/day			EPA-Region 9	10/01/2004
TETRAHYDROFURAN	chronic	3.0E-01	mg/m^3	8.6E-02	mg/kg/day			EPA-Region 9	10/01/2004
THALLIUM	chronic	NA	mg/m^3	NA	mg/kg/day				07/24/2007
TOLUENE	chronic	3.0E-01	mg/m^3	8.6E-02	mg/kg/day	CNS, RESP, DEV	10	OEHHA	11/30/2006
TRANS-1,2-DICHLOROETHENE	chronic	7.0E-02	mg/m^3	2.0E-02	mg/kg/day			EPA-Region 9	10/01/2004
TRICHLOROETHENE	chronic	6.0E-01	mg/m^3	1.7E-01	mg/kg/day	CNS, eyes		OEHHA	11/30/2006
TRICHLOROFLUOROMETHANE (FREON 11)	chronic	7.0E-01	mg/m^3	2.0E-01	mg/kg/day			EPA-Region 9	10/01/2004
VANADIUM	chronic	NA	mg/m^3	NA	mg/kg/day				07/24/2007
VINYL CHLORIDE	chronic	1.0E-01	mg/m^3	2.9E-02	mg/kg/day	Liver	30	IRIS	11/30/2006
ZINC	chronic	NA	mg/m^3	NA	mg/kg/day				07/24/2007

Footnotes:

Cal-EPA: Technical Support Document for Describing Available Cancer Potency Factors (OEHHA 2003).

EPA-NCEA: USEPA Region III Provisional Peer Reviewed Toxicity Values for Superfund (PPRTV) (EPA 2005b).

EPA-Region 9: USEPA Region IX PRG Table (EPA 2004c).

IRIS: Integrated Risk Information System (EPA 2005a).

na: Chemical is listed, no value is available.

ni: No information available.

mg/m^3: milligram per cubic meter.

mg/kg/day: milligram per kilogram per day.

CNS: Central Nervous system

CVS: Cadiovascular system

RESP: Respiratory system

ALIM: Alimentary system

DEV: Developmental

TABLE 5-5
CHEMICAL-SPECIFIC INFORMATION USED FOR DAILY INTAKE CALCULATIONS
Omega Chemical Site - Whittier, California

Chemical of Potential Concern	Chemical Category	Dermal Absorption Fraction[1,2] ABS_d	Gastrointestinal Absorption Fraction[3] ABS_{GI}	Absorption Efficiency ABS_{GI}/ABS_d
1,1,1-TRICHLOROETHANE	VOC	—	1	NA
1,1,2,2-TETRACHLOROETHANE	VOC	—	1	NA
1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE	VOC	—	1	NA
1,1,2-TRICHLOROETHANE	VOC	—	1	NA
1,1-DICHLOROETHANE	VOC	—	1	NA
1,1-DICHLOROETHENE	VOC	—	1	NA
1,2,4-TRIMETHYLBENZENE	VOC	—	1	NA
1,2-DICHLORO-1,1,2-TRIFLUOROETHANE	VOC	—	1	NA
1,2-DICHLOROBENZENE	VOC	—	1	NA
1,2-DICHLOROETHANE	VOC	—	1	NA
1,3,5-TRIMETHYLBENZENE	VOC	—	1	NA
1,3-BUTADIENE	VOC	—	1	NA
1,4-DICHLOROBENZENE	VOC	—	1	NA
1,4-DIOXANE	VOC	0.10	1	10.00
2,2,4-TRIMETHYLPENTANE	VOC	—	1	NA
2-BUTANONE	VOC	—	1	NA
2-METHYLNAPHTHALENE	SVOC	0.10	1	10.00
2-PROPANOL	VOC	—	1	NA
4,4'-DDD	Pesticide	0.03	1	33.33
4,4'-DDE	Pesticide	0.03	1	33.33
4,4'-DDT	Pesticide	0.03	1	33.33
4-ETHYLTOLUENE	VOC	—	1	NA
ACETALDEHYDE	VOC	—	1	NA
ACETONE	VOC	—	1	NA
ALUMINUM	Inorganic	—	1	NA
ANTIMONY	Inorganic	—	0.15	NA
BARIUM	Inorganic	—	0.07	NA
BENZENE	VOC	—	1	NA
BENZO(A)ANTHRACENE	PAH	0.13	1	7.69
BENZO(A)PYRENE	PAH	0.13	1	7.69
BENZO(B)FLUORANTHENE	PAH	0.13	1	7.69
BENZYL ALCOHOL (PHENYLMETHANOL)		0.10	1	10.00
BERYLLIUM	Inorganic	—	1	NA
BIS(2-ETHYLHEXYL)PHTHALATE	SVOC	0.10	1	10.00
BROMODICHLOROMETHANE	VOC	—	1	NA
BROMOFORM	VOC	0.10	1	10.00
BUTYLBENZYL PHTHALATE	SVOC	0.10	1	10.00
CADMIUM	Inorganic	0.001	0.025	25.00
CARBON DISULFIDE	VOC	—	1	NA
CARBON TETRACHLORIDE	VOC	—	1	NA
CHLOROFORM	VOC	—	1	NA

TABLE 5-5
CHEMICAL-SPECIFIC INFORMATION USED FOR DAILY INTAKE CALCULATIONS
Omega Chemical Site - Whittier, California

Chemical of Potential Concern	Chemical Category	Dermal Absorption Fraction[1,2] ABS_d	Gastrointestinal Absorption Fraction[3] ABS_{GI}	Absorption Efficiency ABS_{GI}/ABS_d
CHROMIUM	Inorganic	—	0.013	NA
CHROMIUM III	Inorganic	—	0.013	NA
CHROMIUM VI	Inorganic	—	0.025	NA
CHRYSENE	PAH	0.13	1	7.69
CIS-1,2-DICHLOROETHENE	VOC	—	1	NA
COBALT	Inorganic	—	1	NA
COPPER	Inorganic	—	1	NA
CYCLOHEXANE	VOC	—	1	NA
DIBROMOCHLOROMETHANE	VOC	—	1	NA
DICHLORODIFLUOROMETHANE	VOC	—	1	NA
DIELDRIN	Pesticide/PCB	0.10	1	10.00
ETHANOL	VOC	—	1	NA
ETHYLBENZENE	VOC	—	1	NA
FLUORANTHENE (IDRYL)	PAH	0.13	1	7.69
HEPTANE	VOC	—	1	NA
HEXANE (N-HEXANE)	VOC	—	1	NA
IRON	Inorganic	—	1	NA
ISOPHORONE		0.10	1	10.00
LEAD	Inorganic	—	1	NA
M,P-XYLENES	VOC	0.10	1	10.00
MANGANESE	Inorganic	—	0.04	NA
MERCURY	Inorganic	—	1	NA
METHYL TERT-BUTYL ETHER	VOC	—	1	NA
METHYLENE CHLORIDE	VOC	—	1	NA
MOLYBDENUM	Inorganic	—	1	NA
NAPHTHALENE	PAH	0.13	1	7.69
NICKEL	Inorganic	—	0.04	NA
O-XYLENE	VOC	0.10	1	10.00
PCB-1254 (AROCLOR 1254)	PCB	0.14	1	7.14
PENTANE	VOC	—	1	NA
PHENANTHRENE	PAH	0.13	1	7.69
POLYCHLORINATED BI PHENYLS, TOTAL	PCB	0.14	1	7.14
PYRENE	PAH	0.13	1	7.69
SILVER	Inorganic	—	0.04	NA
TETRACHLOROETHENE	VOC	—	1	NA
TETRAHYDROFURAN	VOC	—	1	NA
THALLIUM	Inorganic	—	1	NA
TOLUENE	VOC	—	1	NA
TRANS-1,2-DICHLOROETHENE	VOC	—	1	NA
TRICHLOROETHENE	VOC	—	1	NA

TABLE 5-5
CHEMICAL-SPECIFIC INFORMATION USED FOR DAILY INTAKE CALCULATIONS
Omega Chemical Site - Whittier, California

Chemical of Potential Concern	Chemical Category	Dermal Absorption Fraction[1,2] ABS_d	Gastrointestinal Absorption Fraction[3] ABS_{GI}	Absorption Efficiency ABS_{GI}/ABS_d
TRICHLOROFLUOROMETHANE (FREON 11)	VOC	—	1	NA
VANADIUM	Inorganic	—	0.026	NA
VINYL CHLORIDE	VOC	—	1	NA
ZINC	Inorganic	—	1	NA

(1) EPA 2004. Risk Assessment Guidance for Superfund Volume I: Human Health Evaluation Manual (Part E, Supplemental Guidance for Dermal Risk Assessment) Final. Ju
Exhibit 3-4. "—" signifies that no dermal absorption fraction from soil was provided. VOCs are assumed to volatilize and are accounted for in the inhalation pathway and inc
highly dependent on the speciation of the compound and there is too little data to detemine a reasonable default value.

(2) ABSd values for 1,4-dioxane, bromoform, benzyl alcohol, dieldrin, DDE, DDD, isophorone, and xylenes were obtained from EPA 2004 Region 9 PRG Table.

(3) EPA 2004. Risk Assessment Guidance for Superfund Volume I: Human Health Evaluation Manual (Part E, Supplemental Guidance for Dermal Risk Assessment) Final. Ju
Exhibit 4-1. Default value of 1 signifies that compound was not recommended for adjustment for gastrointestinal absorption efficiencies.

Section 6
Risk Characterization

In the final step of risk assessment, exposure estimates are combined with toxicity criteria presented in the toxicity assessment to estimate carcinogenic risks and noncarcinogenic hazards. EPA Risk Assessment Guidance for Superfund (RAGS) calculations are used to evaluate the risks. Lead (Pb) is an exception. Potential health hazards associated with exposure to lead are estimated using the Adult Lead Methodology as discussed in Section 3.

Equations used for risk and hazards calculations are presented below.

6.1 Risk Equations

Potential cancer risks and potential non-cancer hazards are separately calculated using standard methods from EPA as described in the following sections.

6.1.1 Cancer Risks

Cancer risks are estimated by multiplying exposure estimates for carcinogenic chemicals by corresponding cancer slope factors. The result is a risk estimate expressed as the incremental odds of developing cancer. Commonly, risks (or odds) of developing cancer of one to 100 in one million (1×10^{-6} to 1×10^{-4}) or less are considered to fall within a potentially acceptable range, although decisions on the need for remediation or mitigation are made on a site-by-site basis. Lower risks are typically considered de minimis, while higher risks are often deemed unacceptable (EPA, 1992). In such instances, mitigation of risks may be considered necessary.

Carcinogenic risks are estimated as the incremental probability that an individual will develop cancer over a lifetime as a direct result of exposure to potential carcinogens (EPA, 1989). The estimated risk is expressed as a unitless probability. The equation for calculating the potential excess cancer risk for each carcinogenic chemical is:

$$Risk_i = CDI_i \times CSF_i$$

Where:

$Risk_i$ = Lifetime Excess Cancer Risk from exposure to $chemical_i$

CDI_i = Chronic Daily Intake for $chemical_i$ in milligrams per kilograms per day (mg/kg-day)

CSF_i = Inhalation Cancer Slope Factor $(mg/kg\text{-}day)^{-1}$

An estimate of an individual's incremental excess cancer risk from potential exposure to multiple chemicals emitted from the site is then calculated by summing the chemical-specific excess cancer risks (i.e., Total risk = $\Sigma Risk_i$).

6.1.2 Chronic Non-Cancer Hazards

For COPCs that are not classified as carcinogens and for those carcinogens known to cause adverse health effects in addition to cancer, chronic non-cancer hazard indices are calculated by dividing exposure estimates by reference doses. As discussed in Section 4, Non-Cancer Reference Doses, reference doses are estimates of highest exposure levels that would not cause adverse health effects even if exposures continue over a lifetime. The potential for exposure to result in non-carcinogenic effects is evaluated by comparing estimated daily dose to the chemical-specific non-cancer RfD. The ratio of exposure to reference dose is termed the hazard quotient (HQ). A HQ greater than one indicates an exposure greater than that considered safe. Risks or odds of adverse effects cannot be estimated using references doses. However, because reference doses are developed in a conservative fashion, HQs only slightly higher than one are generally accepted as being associated with low risks (or even no risk) of adverse effects, and that potential for adverse effects increases as the HQ gets larger.

Impacts of exposure to multiple chemicals are accounted for by adding estimated HQs for non-carcinogenic chemicals that affect the same target organ or tissue in the body. Addition of HQs for COPCs that produce effects in similar organs and tissues results in a HI that reflects possible cumulative hazards. To evaluate the potential for non-carcinogenic adverse health effects from simultaneous exposure to multiple chemicals, hazard quotients for all chemicals that affect the same target organs are summed yielding hazard indices (HI). In general practice, all hazard quotients are summed to yield a total hazard index. If that total hazard index is greater than one, then the hazard quotients for the different chemicals are separated by toxicity endpoint and then summed to determine the total hazard index for each toxicity endpoint. The RAGS D tables provided in Appendix A-3 have been modified to show the total hazard index followed by a breakdown of the hazard index by toxicity endpoint.

Equations for calculating the chemical-specific hazard quotients and the overall hazard index are:

$$HQ_i = \frac{CDI_i}{RfD_i}$$

$$HI = \Sigma HQ_i$$

Where:

HI = Hazard Index

HQ_i = Hazard Quotient for individual $chemical_i$

CDI_i = Chronic daily intake for $chemical_i$ (mg/kg-day)

RfD_i = Chronic Non-cancer Inhalation Reference Dose for $chemical_i$ (mg/kg-day)

6.2 Risk Characterization Results

Cancer risks and non-cancer hazards for current and future receptors at the Site are summarized in Tables 6-1 and 6-2, respectively. The risk calculation spreadsheets are provided in Appendix A.

6.2.1 Cancer Risks

Total cancer risk estimates for current commercial/industrial worker on the Site parcel (Three Kings Construction CTE, 2E-5 to 9E-5 and RME, 4E-5 to 1E-4; Star City Auto Body CTE, 3E-5 to 6E-5 and RME, 4E-5 to 9E-5) are above the point of departure of one in one million but within the EPA risk range (Table 6-1). Cancer risks for the industrial/commercial worker are primarily attributable to inhalation of indoor air (Figure 6-1).

Total cancer risk estimates for future commercial/industrial indoor worker based on data from All Parcels (CTE, 9E-6 to 3E-4 and RME, 1E-5 to 5E-4) are above the EPA risk range (Table 6-2). Total cancer risk estimates for future commercial/industrial outdoor worker based on data from All Parcels (CTE, 1E-5 to 7E-5 and RME, 1E-5 to 9E-5) are above the point of departure of one in one million but within the EPA risk range. Total cancer risk estimates for the future construction worker (CTE, 4E-7 to 2E-5 and RME, 3E-06 to 1E-4) on the Site parcel; on the Others Parcels (CTE, 3E-7 to 2E-5 and RME, 1E-06 to 1E-4); and on All Parcels (CTE, 4E-7 to 1E-5 and RME, 2E-06 to 1E-4) are above the point of departure of one in one million but within the EPA risk range. Total cancer risk estimates for future residents (adult, 5E-5 to 3E-3; adult+child, 8E-5 to 3E-3; and child, 4E-5 to 1E-3) on the Site parcel and on the Others Parcels (adult, 2E-5 to 4E-3; adult+child, 4E-5 to 5E-3; and child, 3E-5 to 2E-3) are above the EPA risk range. Cancer risks for the industrial/commercial worker and residents are primarily attributable to inhalation of indoor air (Figure 6-2). Cancer risks for construction workers are primarily attributable to inhalation of ambient air (Figure 6-3). The following discussions separately describe risks associated with soil and indoor air exposure in more detail.

Risks Associated With Soil Exposure

Risks associated with surface soil exposure only account for about 10 percent of the total cancer risks for the current commercial/industrial worker in the Three Kings Construction building and 15 percent in the Star City Auto Body building and are within the middle of the EPA risk range (CTE, 9E-6 and RME, 2E-5) (Table 6-1, Figure 6-1). Similarly risks associated with soil exposure for the future commercial/industrial worker account for about 2 percent of the total cancer risks for the indoor worker (CTE, 8E-6 and RME, 1E-5) and 15 percent for the outdoor worker (CTE, 1E-5 and RME, 1E-5), and are also within the middle of the EPA risk range (Figure 6-2). Risks associated with surface soil exposure for current and future commercial/industrial indoor workers are not likely to be realized. In a

commercial/industrial setting, most of the surface soil at the site will be covered by buildings, concrete/asphalt driveways, and landscaped grounds. Little bare soil would be available for contact and estimated risks for this pathway are greatly exaggerated.

Risks associated with surface soil exposure only account for about 1 percent of the total cancer risks for the adult and adult+child residents and 2 percent for the child resident and are within the middle of the EPA risk range (adult, 2E-5; adult+child, 4E-5; and child, 3E-5) (Table 6-2, Figure 6-2).

For construction workers, the risks associated with oral and dermal exposure to surface and subsurface soil and inhalation of fugitive dust only account for 1 to 2 percent of the total cancer risks and are within the lower EPA risk range (CTE, 2E-7 and RME, 1E-6) (Table 6-2, Figure 6-3). Because there is only one set of soil data for the site, soil risks are the same for the Site Parcel, Others Parcels, and All Parcels. However, site-related contamination is likely to be highest near source areas at the site, and similar or lower levels of COPCs are anticipated in adjacent properties that were not sampled. Thus, minimal risks from exposure to site-related chemicals in soils are expected in surrounding parcels.Benzo(a)pyrene accounts for about 44 to 48 percent of the cancer risk for construction workers (RME and CTE, respectively). PCB-1254 and total PCBs collectively accounts for about 25 to 28 percent of the cancer risk for construction workers (RME and CTE, respectively).

Risks Associated With Indoor Air Exposure

Potential inhalation of indoor air is the primary contributor to cancer risks (Three Kings Construction CTE, 1E-5 to 8E-5 and RME, 2E-5 to 1E-4; Star City Auto Body CTE, 2E-5 to 5E-5 and RME, 3E-5 to 7E-5) for a current industrial/commercial worker on the Omega Site parcel (Table 6-1, Figure 6-1). Inhalation of benzene accounts for 38 (Star City) to 46 (Three Kings) percent of the cancer risk. Inhalation of methylene chloride accounts for 38 percent of the cancer risk for commercial/industrial workers at Three Kings, while inhalation of PCE accounts for 50 percent of the risk at Star City Auto Body (Figure 6-4). Onsite, sources at Star Auto Body and/or 3 Kings Construction could be responsible for some or all of the benzene detected in indoor air.

For the other buildings, cancer risks were assessed only for the inhalation of vapors intruding into indoor air. Estimated Inhalation cancer risks for these parcels were similar to, or lower than, those for the Site parcel, except for the West Parcel - Terrapave (Figure 6-5). All inhalation cancer risks were above the point of departure of one in one million but within the EPA risk range.

Inhalation cancer risks for the five parcels are summarized as follows (Figure 6-4). Cancer risks for the north parcel (Medlin & Sons CTE, 1E-5 to 3E-5 and RME, 2E-5 to 5E-5) are primarily attributable to exposure to PCE (48 percent) with lesser contributions from carbon tetrachloride (21 percent), benzene (12 percent), and TCE

(10 percent). Cancer risks for the west parcel (TerraPave CTE, 4E-5 to 1E-4 and RME, 6E-5 to 1E-4) are primarily attributable to exposure to PCE (88 percent) with lesser contributions from carbon tetrachloride (4 percent) and benzene (5 percent). Cancer risks for the south parcel – Bishop (CTE, 1E-5 to 3E-5 and RME, 2E-5 to 5E-5) are primarily attributable to exposure to PCE (71 percent) with lesser contributions from carbon tetrachloride (10 percent) and benzene (14 percent). Cancer risks for the south parcel – LA Carts (CTE, 9E-6 to 1E-5 and RME, 1E-5 to 2E-5) are primarily attributable to exposure to benzene (56 percent) with lesser contributions from carbon tetrachloride (20 percent) and PCE (8 percent). Cancer risks for the south parcel – Oncology Care (CTE, 1E-5 and RME, 2E-5) are primarily attributable to exposure to benzene (39 percent) with lesser contributions from carbon tetrachloride (26 percent) and chloroform (17 percent).

Benzene and carbon tetrachloride are observed in similar concentrations in ambient air and indoor air for parcels other than the Omega site itself. Ambient levels of benzene were reported between 0.8 to 1.09 $\mu g/m^3$, compared to indoor air concentrations for adjacent parcels (0.89 to 2.17 $\mu g/m^3$, with only one concentration above 2 $\mu g/m^3$). Benzene concentrations in shallow soil gas samples (5 to 6 feet bgs) are greater on-site (45 to 2,074 $\mu g/m^3$ – Table 3-7b) than on the adjacent parcels (8 to 16 $\mu g/m^3$ – Table 3-7c). This same trend is visible in the deeper soil gas (5 to 30 feet bgs) with benzene concentrations ranging from 31 to 3,828 $\mu g/m^3$ on-Site (Table 3-8b) compared to the range of 3 to 89 $\mu g/m^3$ (Table 3-8c) on the adjacent parcels. Ambient concentrations of carbon tetrachloride ranged from 0.5 to 0.63 $\mu g/m^3$, compared to indoor air concentrations ranging from 0.5 to 1.3 $\mu g/m^3$. Further, carbon tetrachloride is reported infrequently in the subsurface (once among 46 shallow soil gas samples); carbon tetrachloride in the subsurface does not appear to represent a significant source. Carbon tetrachloride was also not detected in shallow soil gas samples (5 to 6 feet bgs – Table 3-7c) or the deeper soil gas samples (5 to 30 feet bgs – Table 3-8c) collected from the Other Parcels. Although benzene in soil gas could be partially responsible for indoor air concentrations, indoor air concentrations of carbon tetrachloride may well have its source in ambient air rather than soil vapors. This interpretation is supported by the lack of PCE and other chemicals in indoor air in the LA Carts/Oncology Care buildings. These VOCs are found in very high concentrations in soil gas. If subsurface vapors were intruding into buildings, one would expect to find PCE along with benzene and carbon tetrachloride in indoor air.

The high concentrations of individual VOCs in groundwater, most notably PCE, suggest the presence of a dense non-aqueous phase liquid (DNAPL). MIP data, discussed in the following section, demonstrate the highest content of VOCs within the capillary fringe, suggesting that DNAPL is present as residual saturation in this depth interval. The DNAPL is likely a continuous source of groundwater contamination at the former Omega Chemical property, as evidenced by persistently high VOC concentrations in groundwater at Putnam Street.

Chloroform, though detected in soil gas and groundwater, is also common in municipal water as a result of chlorination, and is a common indoor air contaminant. Chloroform concentrations detected in indoor air are relatively low (0.14 to 0.68 $\mu g/m^3$) compared to shallow soil gas samples (5 to 6 feet bgs) concentrations of 93 to 14,640 $\mu g/m^3$ for on-Site (Table 3-7b) and 73 to 1,757 $\mu g/m^3$ for adjacent parcels (Table 3-7c). Although the indoor air concentrations are greater than Cal-modified Region 9 ambient air PRG for chloroform (0.35 $\mu g/m^3$), they are still considerably below the Agency for Toxic Substances and Diseases Registry (ATSDR) established acute inhalation minimal risk level (MRL) of 500 $\mu g/m^3$ (0.1 ppm) and chronic inhalation MRL of 100 $\mu g/m^3$ (0.02 ppm) for chloroform. ATSDR's public health statement for chloroform also states that amount of chloroform normally expected to be in the air ranges from 0.1 to 0.25 $\mu g/m^3$ (0.02 to 0.05 ppb) of air and from 2 to 44 ppb in treated drinking water (ATSDR 1997). The indoor air concentrations are certainly consistent with a source in municipal water. Again, this interpretation is supported by the lack of PCE and other chemicals in indoor air in the LA Carts/Oncology Care buildings. These VOCs are found in very high concentrations along with chloroform in soil gas. Although chloroform in soil gas could be partially responsible for indoor air concentrations, one would expect to find these other VOCs along with chloroform in indoor air if subsurface vapors were intruding into buildings. Chloroform was not reported in ambient air samples. Without the contributions of benzene, carbon tetrachloride, and chloroform which could be attributable to background, inhalation cancer risks for the industrial workers at the buildings would be as follows:

- North Parcel - Medlin & Sons: RME, 3E-5 (compared to RME, 5E-5 with benzene, carbon tetrachloride, and chloroform)
- West Parcel - TerraPave: RME, 1E-4 (compared to RME, 1E-4 with benzene, carbon tetrachloride, and chloroform)
- South Parcel – Bishop: RME, 3E-5 (compared to RME, 5E-5 with benzene, carbon tetrachloride, and chloroform)
- South Parcel - LA Carts: RME, 4E-6 (compared to RME, 2E-5 with benzene, carbon tetrachloride, and chloroform)
- South Parcel - Oncology Care: RME, 3E-6 (compared to RME, 2E-5 with benzene, carbon tetrachloride, and chloroform)

The above considerations suggest that background risks, unrelated to vapor intrusion of site-related contaminants is in the range of $1x10^{-5}$. Such risk suggests that incremental risks possibly related to site contamination are a significant portion of total risks associated with VOCs in indoor air. Background risks account for essentially all risks at the LA Carts/Oncology Care buildings and 10 to 50 percent of total risks for surrounding parcels.

Risks associated inhalation of indoor air for the future adult resident (Site Parcel: 3E-5 to 3E-3, Others Parcel: 3E-6 to 4E-3), adult+child resident (Site Parcel: 4E-5 to 3E-3, Others Parcel: 4E-6 to 5E-3), and the child resident (Site Parcel: 2E-5 to 1E-3, Others Parcel: 1E-6 to 2E-3) range above the EPA risk range (Table 6-2, Figure 6-6). Inhalation of PCE in soil gas accounts for 90 to 95 percent of the total inhalation risk (Figure 6-7).

Risks associated inhalation of indoor air for the future commercial/industrial indoor worker (CTE, 8E-7 to 3E-4 and RME, 1E-6 to 5E-4) calculated from soil gas for All Parcels also result in risks above the EPA range (Table 6-2, Figure 6-8). PCE in soil gas accounts for 90 percent of the total inhalation risk (Figure 6-7).

Risks Associated With Ambient Air Exposure

Risks associated inhalation of ambient air for the future commercial/industrial outdoor worker (CTE, 2E-7 to 6E-5 and RME, 2E-7 to 7E-5) calculated from soil gas for All Parcels result in risks within the EPA range. For construction workers, the risks associated with inhalation of ambient air are also all within the EPA risk range (CTE, 2E-7 to 2E-5 and RME, 1E-6 to 1E-4; Other Parcels: CTE, 1E-8 to 2E-5 and RME, 1E-7 to 1E-4); and All Parcels: CTE, 2E-7 to 1E-5 and RME, 1E-6 to 1E-4) (Table 6-2, Figure 6-8). PCE in soil gas accounts for 73 to 81 percent of the total inhalation risk (Figure 6-9).

6.2.2 Chronic Non-Cancer Hazards

Chronic non-cancer hazards for the current commercial/industrial worker (Three Kings CTE, 0.4 to 1.2 and RME, 0.6 to 2; Star City Auto CTE, 0.5 to 5.1 and RME, 0.8 to 8) are above the threshold of 1. HIs for the commercial/industrial worker are primarily attributable to inhalation of indoor air (Figure 6-11). Total HIs for future residents (Site Parcel: adult, 0.7 to 30; adult+child 1.4 to 39; and child, 4.1 to 74; Other Parcels: adult, 0.4 to 45; adult+child 1 to 58; and child, 3.4 to 109) are above the target threshold. Total HIs for future commercial/industrial workers (Indoor: CTE, 0.15 to 4.4 and RME, 0.3 to 7; and Outdoor: CTE, 0.23 to 1 and RME, 0.3 to 1.4) based on data from All Parcels are above the target threshold. Total hazard indices for the construction worker (Site Parcel: CTE, 0.13 to 6 and RME, 1.2 to 48; Other Parcels: CTE, 0.09 to 4.5 and RME, 0.9 to 36; and All Parcels: CTE, 0.12 to 4.4 and RME, 1.2 to 35) are also above the target HI of one. HIs for the construction worker are primarily attributable to inhalation of ambient air (Figure 6-12). The following discussions separately describe the hazards associated with soil exposure and indoor air in more detail.

Hazards Associated With Soil Exposure

Hazards associated with surface soil exposure only account for 3 (Star City Auto Body) to 12 (Three Kings Construction) percent of the total HIs for the current and future commercial/industrial worker and are below the target threshold of one (Table 6-2, Figure 6-10). For future commercial/industrial worker, HIs associated with oral and dermal exposure to surface and subsurface soil and inhalation of fugitive dust are below the target threshold of one for the CTE scenario (indoor: 0.14; outdoor: 0.2) and

RME scenario (indoor: 0.3; outdoor: 0.3). Risks associated with surface soil exposure for the current and future commercial/industrial indoor workers are not likely to be realized. In a commercial/industrial setting, most of the surface soil at the site will be covered by buildings, concrete/asphalt driveways, and landscaped grounds. Little bare soil would be available for contact and estimated risks for this pathway are greatly exaggerated.

For future residents, HIs associated with oral and dermal exposure to surface and subsurface soil are below the target threshold of one for the adult scenario (0.3) and the adult+child scenario (0.9) and above the threshold for the child scenario (3.2).

For future construction workers, HIs associated with oral and dermal exposure to surface and subsurface soil and inhalation of fugitive dust are below the target threshold of one for the CTE scenario (0.08) and RME sceanario (0.8).

Hazards Associated With Indoor Air Exposure

The highest HQs for the Site parcel for the current commercial/industrial worker are at the Star City Auto Body (total hazard index of 8) and are attributable to inhalation exposure to toluene and acetone, which account for 54 and 13 percent of site-related inhalation HIs, respectively (Figure 6-13). When the total HI is divided by target organ, HI associated with kidneys is the largest portion (66 percent of the total HI, or an HI of 3.3, CTE and 5.3, RME). HI associated with body weight effects is the second largest (23 percent of the total HI, or an HI of 1.2, CTE and 1.8, RME). HIs for all other organs are less than the threshold of 1.

HIs for the current commercial/industrial worker on the Site parcel at the Three Kings building (total hazard index of 2) are attributable to inhalation exposure to toluene (18 percent), m,p-xylenes (27 percent), methylene chloride (21 percent), PCE (12 percent), and benzene (12 percent). When the total HI is divided by target organ, HIs for all organs are less than the threshold of 1.

For the other five parcels, HIs were assessed only for the inhalation of vapors intruding into indoor air. Inhalation HIs for the other buildings were all below the HIs for Star City Auto Body and slightly above the target HI of one (ranging from 0.1 to 1.8), indicating that non-cancer hazards at these parcels are minimal. Inhalation HIs for the five parcels are summarized as follows (Figures 6-13 and 6-14). HIs for the north parcel (Medlin and Sons, CTE, 0.09 to 0.65 and RME, 0.1 to 1; Medlin and Sons North, CTE, 0.05 and RME, 0.08) are primarily attributable to exposure to acetone (55 percent) with a lesser contribution from PCE (32 percent). HIs for the west parcel (TerraPave, CTE, 0.5 to 1.28 and RME, 0.7 to 1.8) are primarily attributable to exposure to PCE (90 percent). HIs for the south parcel – Bishop (CTE, 0.1 to 0.4 and RME, 0.2 to 0.6) are primarily attributable to exposure to PCE (76 percent) with a lesser contribution from 1,1-DCE (6 percent). HIs for the south parcel – LA Carts (CTE, 0.06 to 0.8 and RME, 0.1 to 1.3) are primarily attributable to exposure to toluene (74 percent) with a lesser contribution from acetone (15 percent). HIs for the south

parcel – Oncology Care (CTE, 0.09 and RME, 0.14 to 0.15) are primarily attributable to exposure to toluene (20 percent), 1,2-DCA (23 percent), benzene (14 percent) and acetone (11 percent). The highest HIs by toxicity endpoints for these other parcels are at Terrapave, where the total HI to the liver is 1.7, and at LA Carts, where the total HI to the kidney is 1.3. All other HIs by toxicity endpoints were below one.

The highest HQs for residents are calculated from data from the Other Parcels (adult: 45, adult+child: 58, and child 109) and are attributable to inhalation exposure to PCE and 1,1-DCE, which account for 90 and 6 percent of HIs for the child resident on the Other Parcels and 86 and 8 percent of HIs for the child resident on the Site Parcel (Figure 6-16). When the total HI for the child resident on Other Parcels is divided by target organ, HI associated with liver is the largest portion (93 percent of the total HI, or an HI of 102 for the child). HIs for the unspecified endpoints is 7 and the HIs for all other calculated endpoints (body weight effects and kidneys) are less than the threshold of 1.

Inhalation HIs for the future commercial/industrial indoor worker calculated from data on All Parcels range above the threshold of 1 (CTE, 0.009 to 4.2 and RME, 0.014 to 7) (Figure 6-17). As shown in Table 6-2, inhalation of indoor air is attributable for most of this hazard. Similar to the resident, PCE and 1,1-DCE account for most of the hazard, contributing 84 and 9 percent, respectively (Figure 6-16). When the total HI is divided by target organ for the RME worker, HI associated with liver is the largest portion (90 percent of the total HI, or an HI of 6.4). HIs for all other endpoints are less than the threshold of 1.

Hazards Associated With Ambient Air Exposure

Total ambient air HIs for future commercial/industrial outdoor worker (CTE, 0.002 to 0.8 and RME, 0.002 to 1.1) based on data from All Parcels are below or slightly above the target threshold (Figure 6-17). When the total HI is divided by target organ for the RME worker, HI associated with liver is the largest portion (72 percent of the total HI, or an HI of 1). HIs for all other endpoints are less than the threshold of 1.

For construction workers, the hazards associated with inhalation of ambient air are above the target threshold of one (Site Parcel: CTE, 0.05 to 6 and RME, 0.4 to 47; Other Parcels: CTE, 0.01 to 4.4 and RME, 0.08 to 35; and All Parcels: CTE, 0.05 to 4.3 and RME, 0.4 to 34). As shown in Figure 6-12, nearly 98 percent of the hazards for the future construction worker are related to inhalation of ambient air. Figure 6-18 shows the RME construction worker ambient air hazards by chemical. Hazards are higher on the Site Parcel than on the Other Parcels and than All Parcels combined. Hazards are primarily attributable (74 to 96 percent) to PCE. 1,2-DCA also contributes significantly (9 to 18 percent) to the hazards on the Site Parcel and All Parcels. When the total HI is divided by target organ for the RME Site Parcel worker, HI associated with liver is the largest portion (73 percent of the total HI, or an HI of 35). HIs for the unspecified endpoints is 13 and the HIs for all other calculated endpoints (body weight effects and kidneys) are less than the threshold of 1.

6.2.3 Risks Associated with Lead Exposure

Ingestion of soil by receptors would likely be incidental from hand to mouth activities. The EPA Adult Lead Methodology was used to assess exposure to lead for the current and future industrial worker. The lead model was adjusted for the exposure frequency discussed in Section 4.

For the current commercial/industrial worker, the 95% UCL for lead detected in surface soil was 65.4 mg/kg. The model results indicate that the geometric mean blood lead concentration might range from 1.7 to 1.9 µg/dl for an adult worker. The 95th percentile blood lead concentration of a fetus in an adult worker would range from 5.2 to 6.8 µg/dl. This range is considerably below a typical target of 10 µg/dL. More importantly, the probability that fetal blood levels for pregnant adult worker would exceed the target of 10 µg/dL is 0.6% to 1.7%. Where the probability of exceeding 10 µg/dL is 5 percent or less, lead exposures are typically deemed to fall into an acceptable range.

For the future commercial/industrial worker and RME construction workers, the 95% UCL for lead detected in soil to 12 feet bgs was 59.9 mg/kg. The model results indicate that the geometric mean blood lead concentration might range from 1.7 to 1.9 µg/dl for an adult worker. The 95th percentile blood lead concentration of a fetus in an adult worker would range from 5.2 to 6.7 µg/dl. This range is considerably below a typical target of 10 µg/dL. More importantly, the probability that fetal blood levels for pregnant adult worker would exceed the target of 10 µg/dL is 0.6% to 1.7%. Where the probability of exceeding 10 µg/dL is 5 percent or less, lead exposures are typically deemed to fall into an acceptable range.

The DTSC Leadspread model was used to assess exposure to lead for hypothetical future residents. The lead model was adjusted for the exposure frequency discussed in Section 4. The 95% UCL for lead detected in soil to 12 feet bgs was 59.9 mg/kg. The Leadspread results predict that chronic exposure to 59.9 mg/kg of lead in the soil will result in blood-lead concentrations of 6.7 micrograms per deciliter (ug/dL) in normal nonpica children in the 99th percentile and 8.0 ug/dL in pica children in the 99th percentile. Blood-lead concentrations in adult residents are predicted to be 3.9 ug/dL. All of these values are well below the CalEPA acceptable level of 10 ug/dL. Although the EPA adult lead model was used for the industrial worker, it should be noted that the Leadspread occupational calculation for an adult results in a blood lead concentration of 3.9 ug/dL, which is also well below the CalEPA acceptable level of 10 ug/dL.

Therefore, risks due to lead exposure do not appear to be sufficiently high to warrant action.

6.3 Health Based Risk Goals (HBRGs)

Health based risk goals (HBRGs) can be used as guidelines to screen chemical concentrations in media for potential risks. HBRGs conform to EPA Risk Assessment Guidance for Superfund Volume 1, Part B (1991a). They do not automatically represent remediation levels nor do they establish that cleanup action to meet these HBRGs is warranted (EPA 1991). Remediation levels to be used in cleanup activities are selected by the remedial project manager (RPM) following review of site-specific and other considerations, such as availability of data, regional information, uncertainties, and future site use. Action levels may reasonably be selected from the ranges of HBRGs presented in this report.

The City intends to allow redevelopment that consists of commercial and retail uses with the construction of multi-level buildings. Therefore, HBRGs are developed for carcinogenic and noncarcinogenic risks for commercial land use and RME and CTE exposure scenarios. Specifically, City representatives have stated that it is unlikely that the Omega property will be redeveloped for residential uses (Adams, 2007). HBRGs were calculated only for those COPCs for soil and indoor air that had individual cancer risks above 10^{-7} or a hazard above 0.1. These COPCs are likely most important for risk management. By determining acceptable risk (i.e., 1E-06 cancer risk) and combining this with exposure assumptions, it is possible to calculate the average media concentration that results in the selected target risk. This medium concentration, which represents the average concentration across the exposure unit, is the health risk-based goal. HBRG equations combine intakes from the exposure pathways being evaluated, and thus the resulting HBRGs should be protective for total exposures from those pathways.

To calculate HBRGs, target cancer risks or HIs are input to the equations for back calculation to a media concentration. HBRGs are basically the reverse of risk assessment calculations. These calculations use a selected acceptable risk (i.e., a cancer risk of one in one million and a hazard index of 1), exposure variables, and chemical toxicity factors to determine the medium-specific chemical concentration resulting in the selected risk. Exposure variables used in the calculations are the same as those presented in Table 4-2 and toxicity values are the same as those presented in Section 5. Media of concern, COPCs, receptor populations, potential exposure pathways and exposure assumptions for receptors were defined in Section 4. HBRGs calculated for the site are summarized in Table 6-3 with full calculations provided in Appendix A-5.

Exposure assumptions and calculations did not vary among parcels, thus HBRGs for indoor air are applicable for all buildings at the site currently, and for any future buildings that may be constructed. Likewise, although soil data were limited to the Omega site and its boundaries, exposure assumptions and calculations would be the same for surrounding parcels. Thus, HBRGs for soil are also applicable to all parcels. A comparison of HBRGs to maximum detections at each building is provided in Table 6-4. However, risks and hazards potential associated with direct contact with

surface soils are based on assumed exposure to volatile chemicals by commercial/industrial workers. Volatile chemicals will not remain in surface soils for chronic exposure durations, and risks and hazards presented for VOCs in this report are artificially high.

6.3.1 Evaluation of Empirical Attenuation Factors

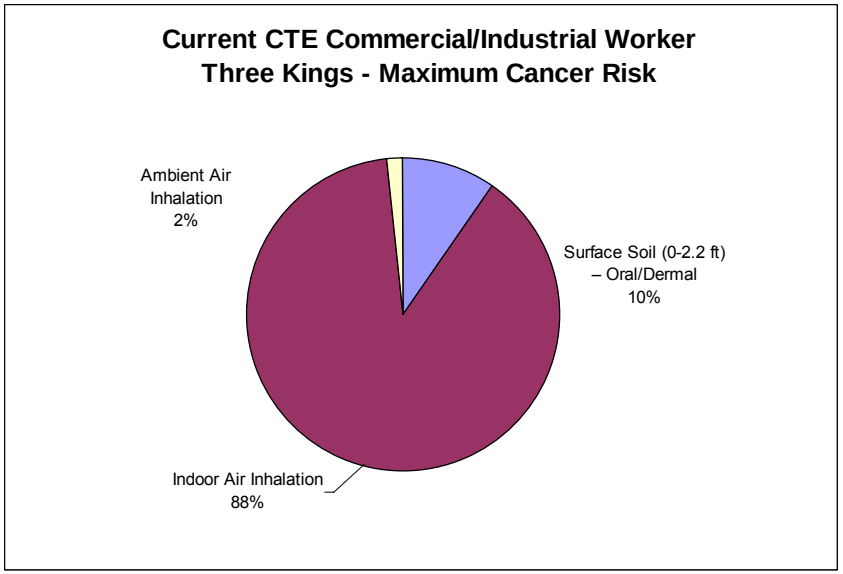
Site data are available for both shallow soil gas collected near building foundations, and indoor air for these same buildings. The ratios of indoor air concentrations to soil gas concentrations provide a measure of possible attenuation factors. Such factors are only valid for chemicals for which ambient air and/or background concentrations do not make a substantial contribution to indoor air contamination. For the analysis of attenuation factors, PCE, TCE and Freon 113 were selected as reasonable indicator factors. These three chemicals are present in very high concentrations in shallow soil gas and were observed in indoor air in ratios similar to those in soil gas. Indoor air concentrations for these VOCs seem likely to reflect, at least in large measure, vapor intrusion.

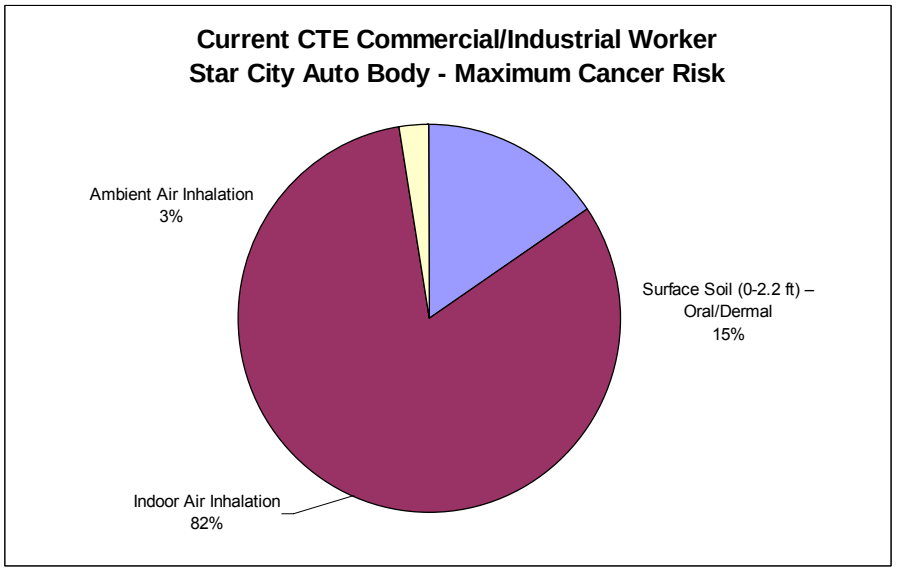
To estimate possible ranges for attenuation factors, minimum indoor air concentrations, by parcel, were divided by maximum soil gas concentrations to give lower end point. The opposite calculation provides the upper range estimate. The mid range was estimated by the ratio of average indoor air concentrations by parcel to average soil gas concentrations. Results of the calculation are provided in Table 6-5.

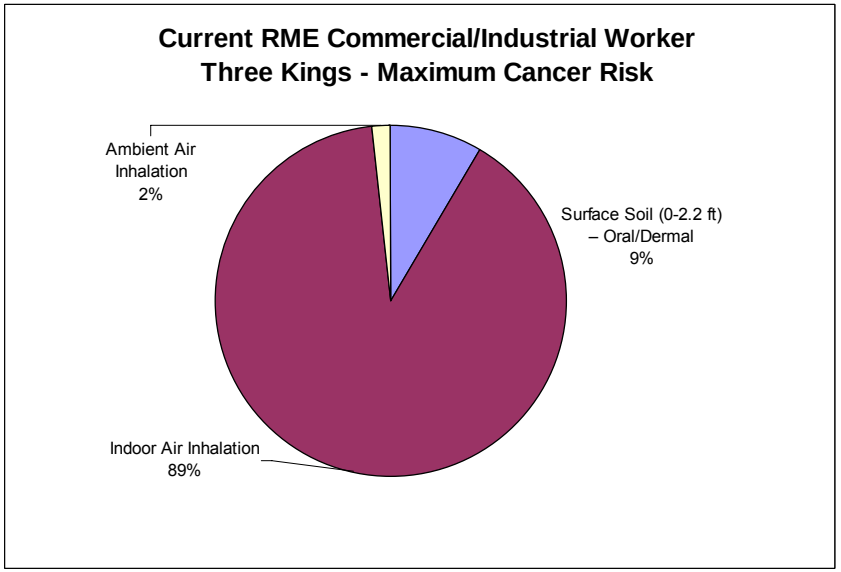
The range of possible attenuation factors are consistent from parcel to parcel, with average ratios falling in the range of 7E-06 to 3E-04. The upper end of this range is consistent with attenuation factors for commercial/industrial workers estimated using the Johnson and Ettinger model. The latter estimates are in the range of 1E-04 and 4E-04.

The overall range of estimates for attenuation factors is quite wide, from 7E-07 to 2E-02. Data are insufficient to determine if the extremes of this range are within those possible for current site conditions. However, soil gas concentrations vary considerably along building perimeters, suggesting that some integrating of concentrations for both soil gas and indoor air might be appropriate for estimating attenuation factors. However, whether an appropriate integration is simple averaging cannot be determined.

Average attenuation factors estimated from empirical results provide some confidence in the results of modeling, in that at least some of these estimates fall within the modeled range. Overall, however, empirical estimates appear too variable to use in estimating HBRGs. A range of HBRGs that spans almost 5 orders of magnitude would be difficult to use in defining remedial strategies.







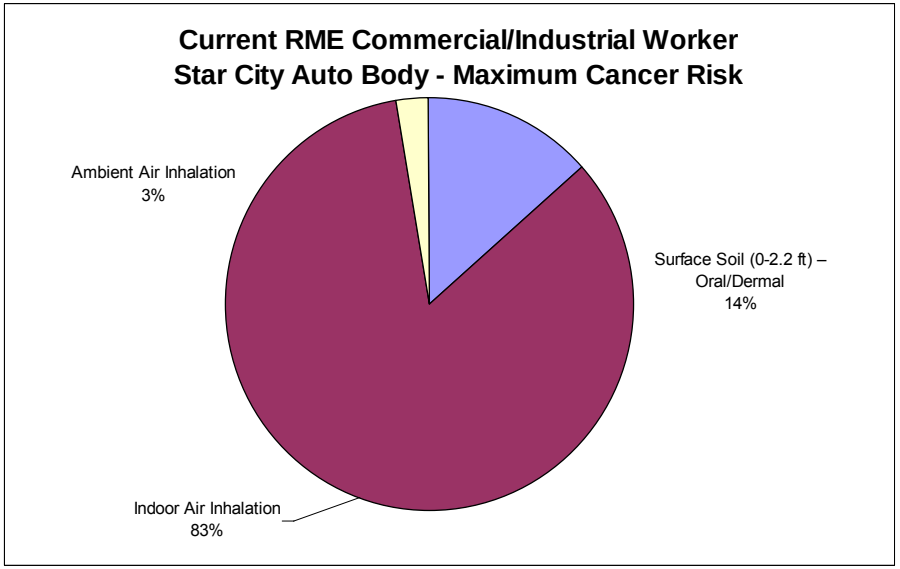
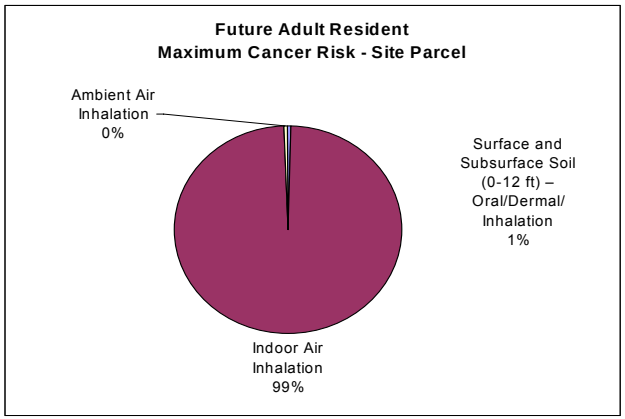
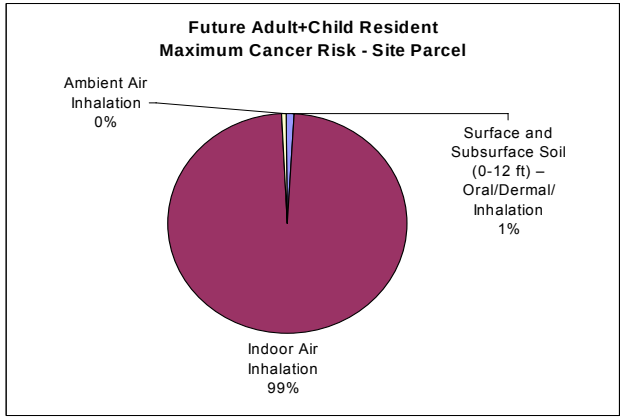
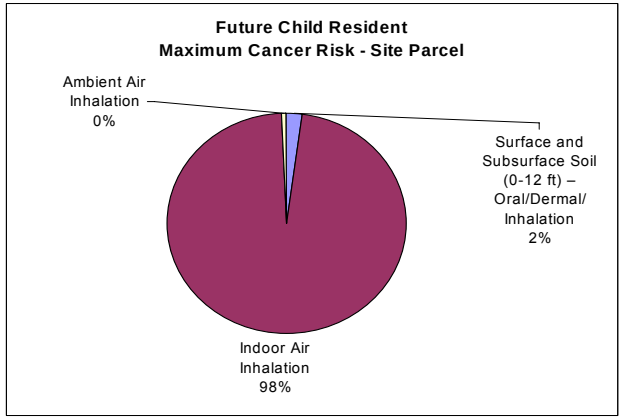
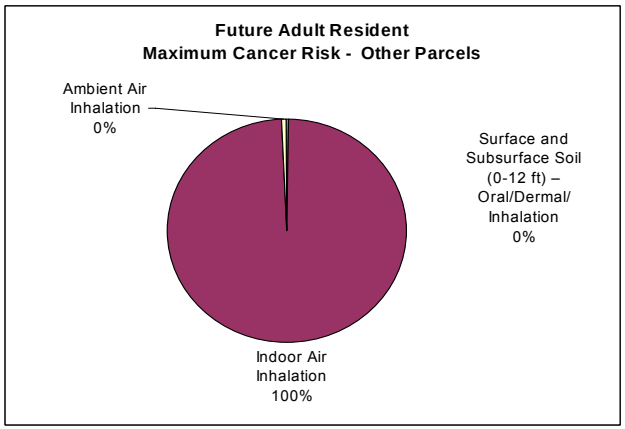


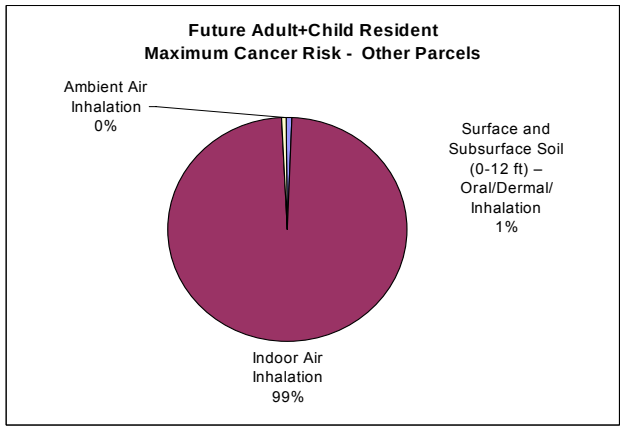
Figure 6-1
Pie Graphs of Total Cancer Risk by Pathway
Current Commercial/Industrial Worker

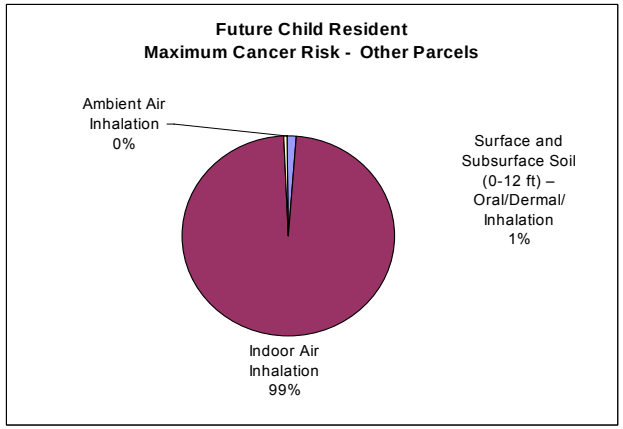


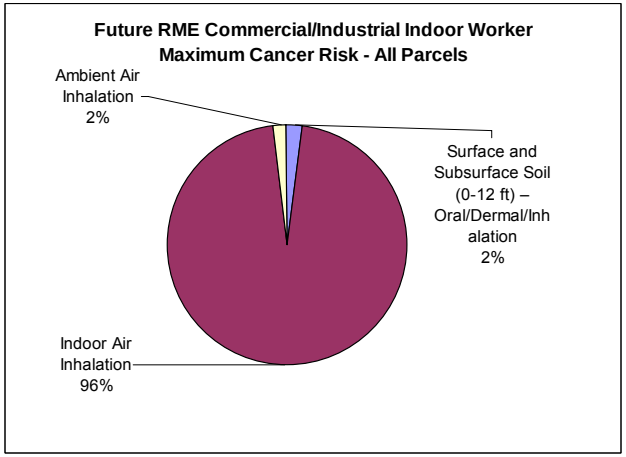












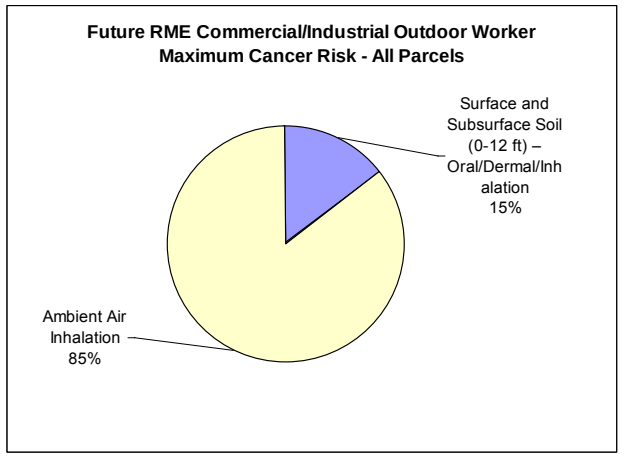


Figure 6-2
Pie Graphs of Total Cancer Risk by Pathway
Future Residents (Adult, Child, and Adult+Child) and
Future Commercial/Industrial Indoor and Outdoor Workers

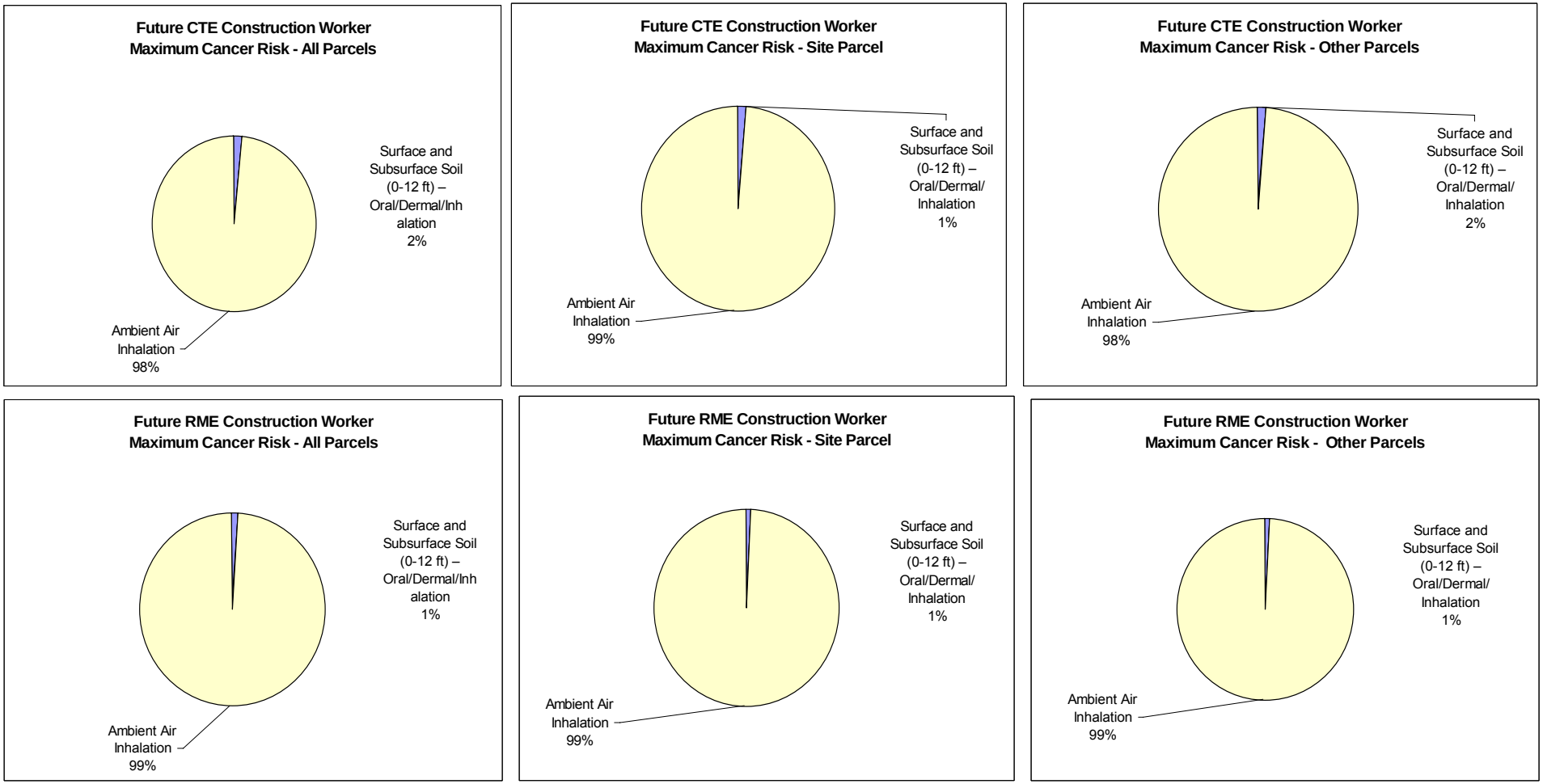
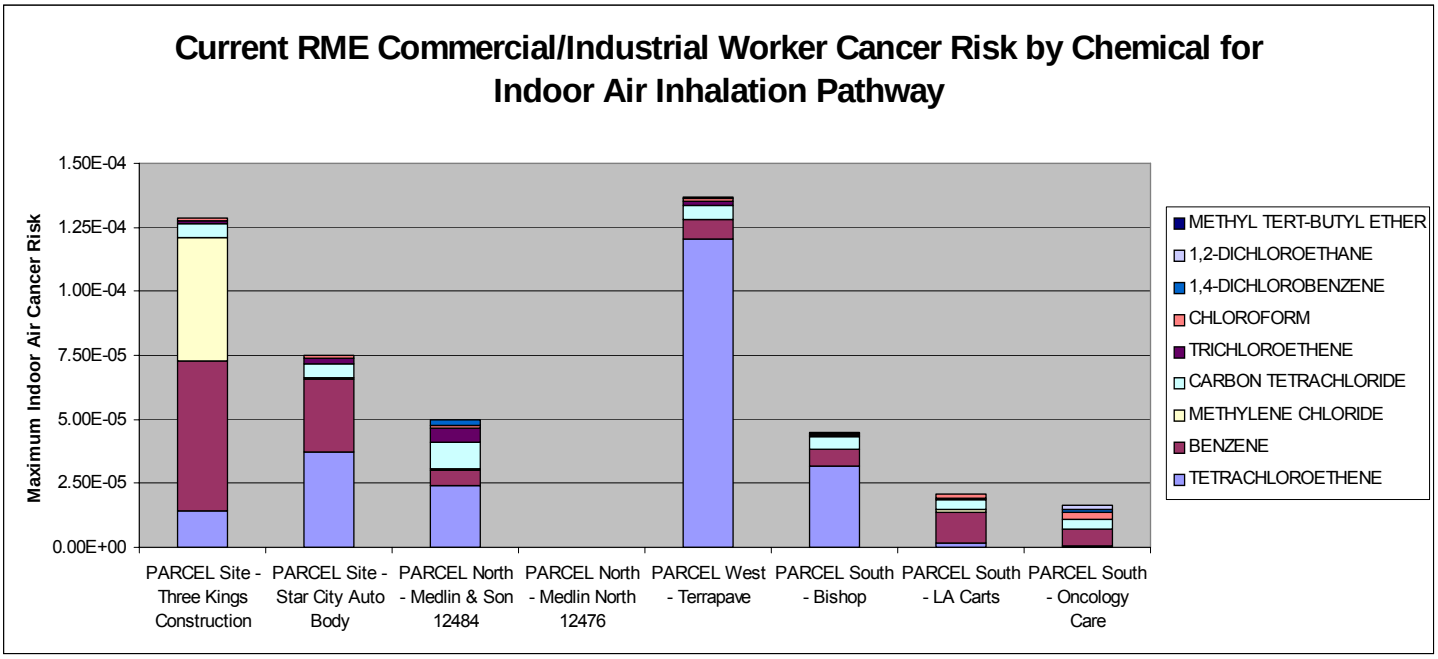
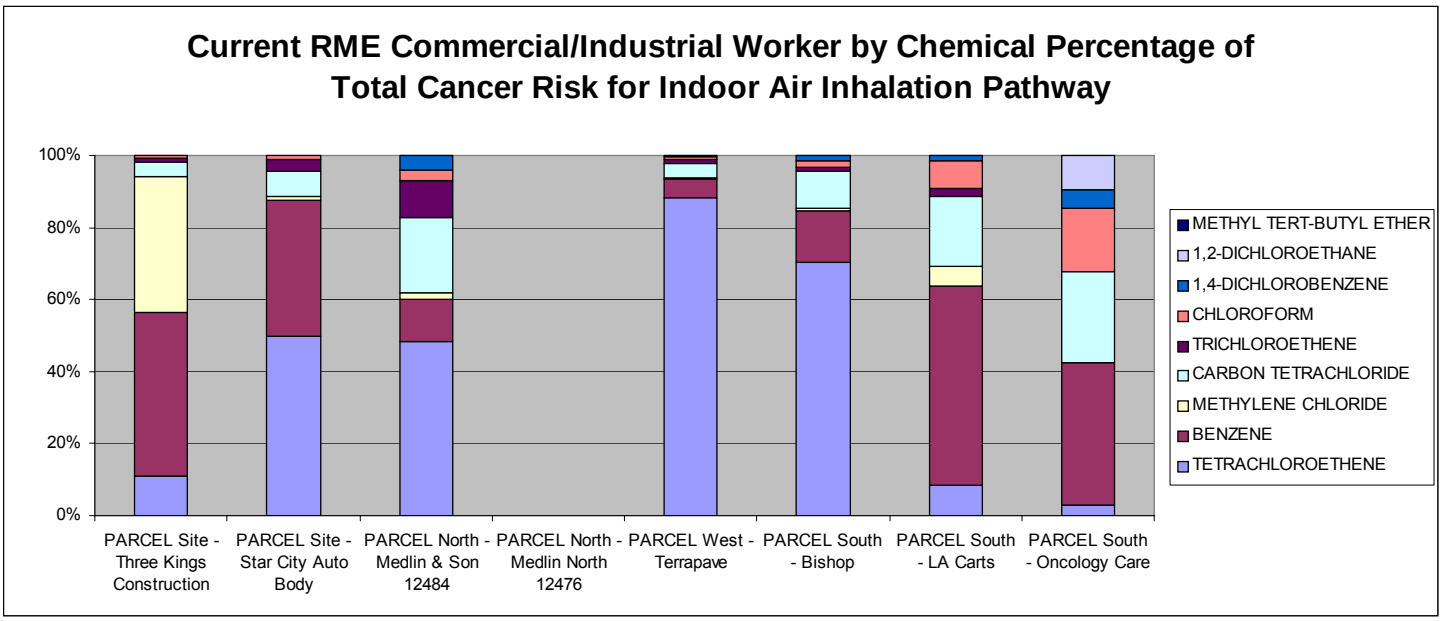


Figure 6-3
Pie Graphs of Total Cancer Risk by Pathway
Future Construction Worker





Chemical	RME Commercial Industrial Worker Cancer Risk by Chemical for Indoor Air Inhalation Pathway							
	PARCEL Site - Three Kings Construction	PARCEL Site - Star City Auto Body	PARCEL North - Medlin & Son 12484	PARCEL North - Medlin North 12476	PARCEL West - Terrapave	PARCEL South - Bishop	PARCEL South - LA Carts	PARCEL South - Oncology Care
1,2-DICHLOROETHANE								9.55%
1,4-DICHLOROBENZENE			4.0%		0.4%	1.5%	1.6%	5.1%
BENZENE	45.5%	37.6%	11.7%		5.4%	14.1%	55.5%	39.4%
CARBON TETRACHLORIDE	4.0%	7.1%	20.8%		3.9%	10.2%	19.7%	25.6%
CHLOROFORM	0.8%	1.1%	2.7%		0.7%	1.7%	7.5%	17.4%
METHYL TERT-BUTYL ETHER						0.1%		
METHYLENE CHLORIDE	37.6%	1.2%	1.9%		0.2%	0.7%	5.2%	
TETRACHLOROETHENE	11.1%	49.8%	48.4%		88.1%	70.5%	8.3%	3.0%
TRICHLOROETHENE	1.0%	3.2%	10.4%		1.2%	1.2%	2.1%	
Other	0.0%	0.0%	0.0%	100.0%	0.0%	0.0%	0.0%	0.0%
TOTAL	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**

Figure 6-4
Current RME Commercial/Industrial Worker Indoor Air Cancer Risks by Chemical

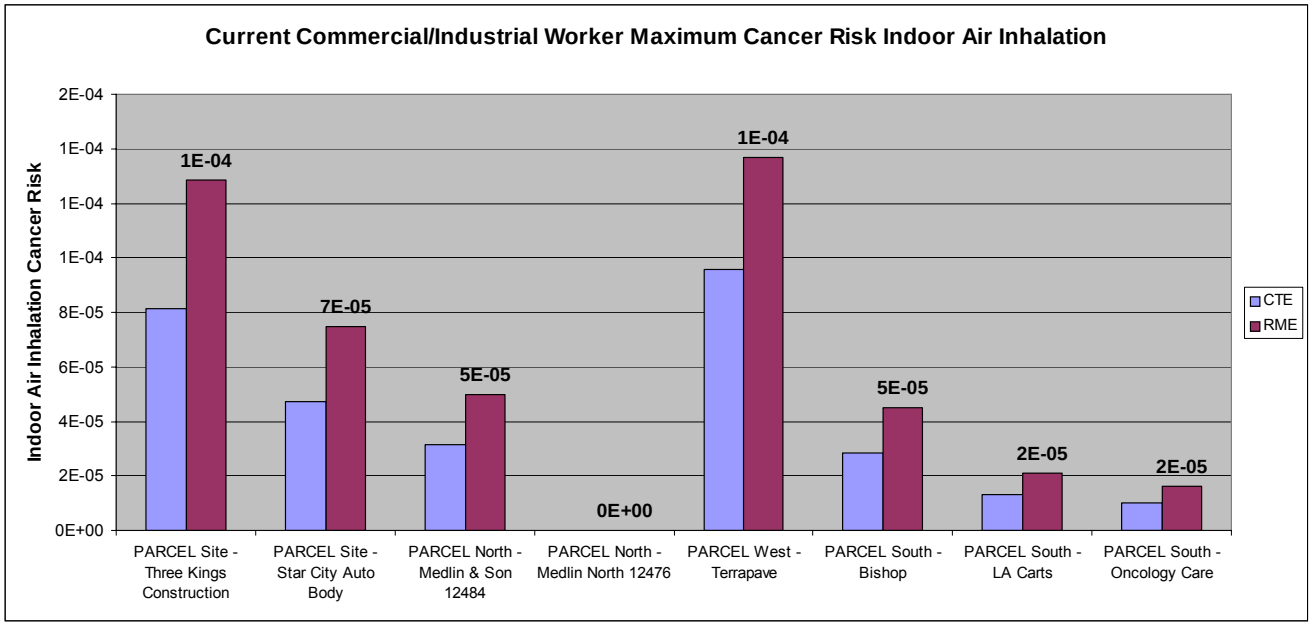


Figure 6-5
Current Commercial/Industrial Worker
Maximum Indoor Air Cancer Risks

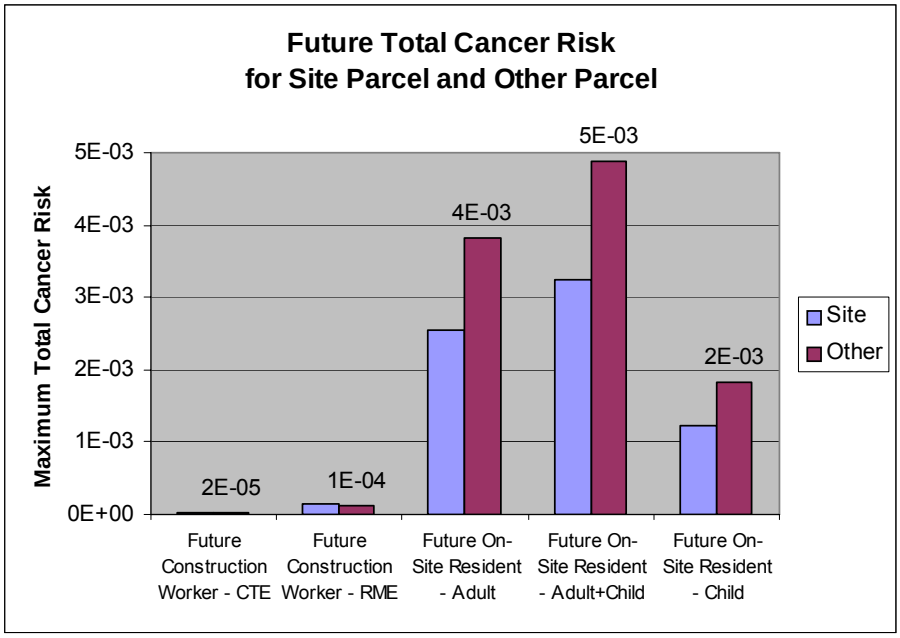
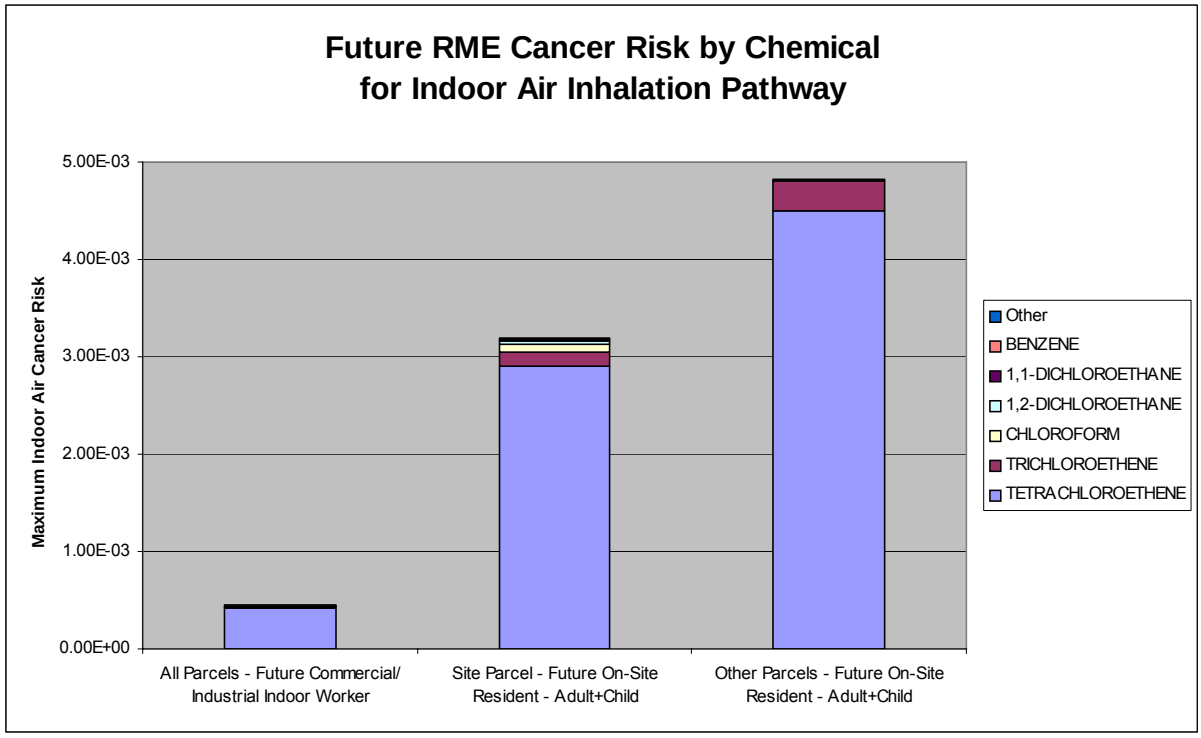


Figure 6-6
Future Residents and Construction Worker
Total Cancer Risks



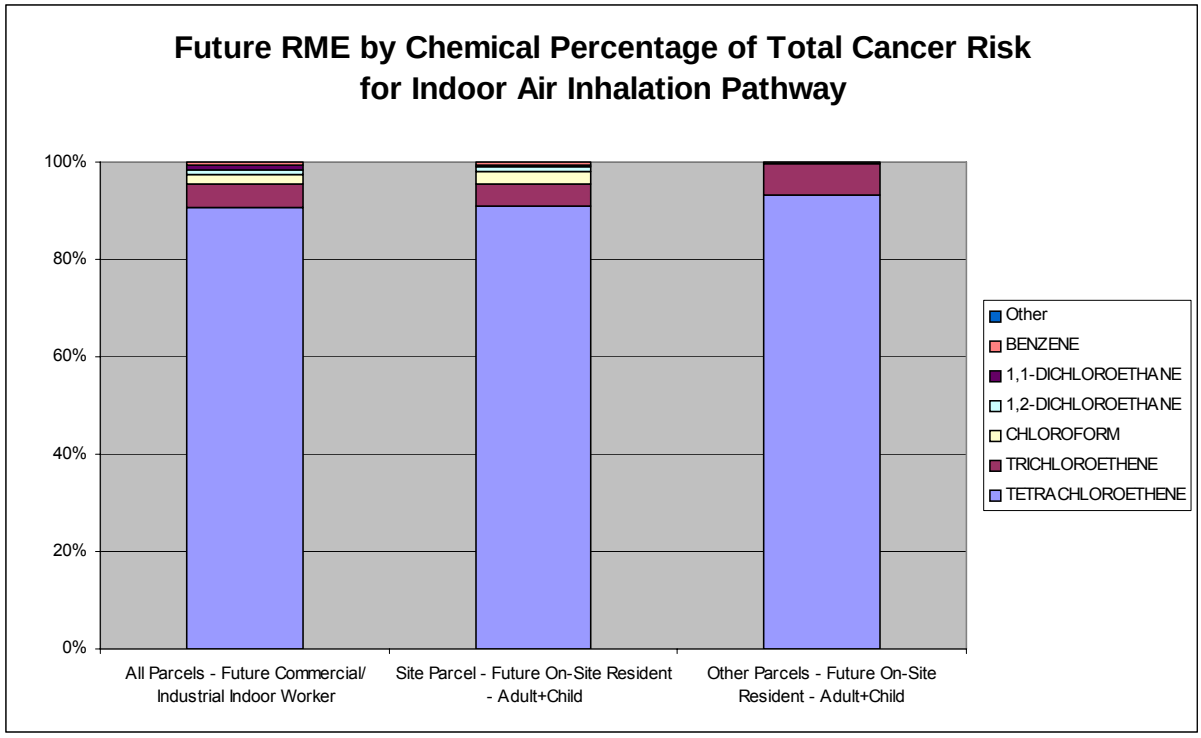


Figure 6-7
Future RME Indoor Air Cancer Risk by Chemical
Industrial Worker and Adult+Child Resident

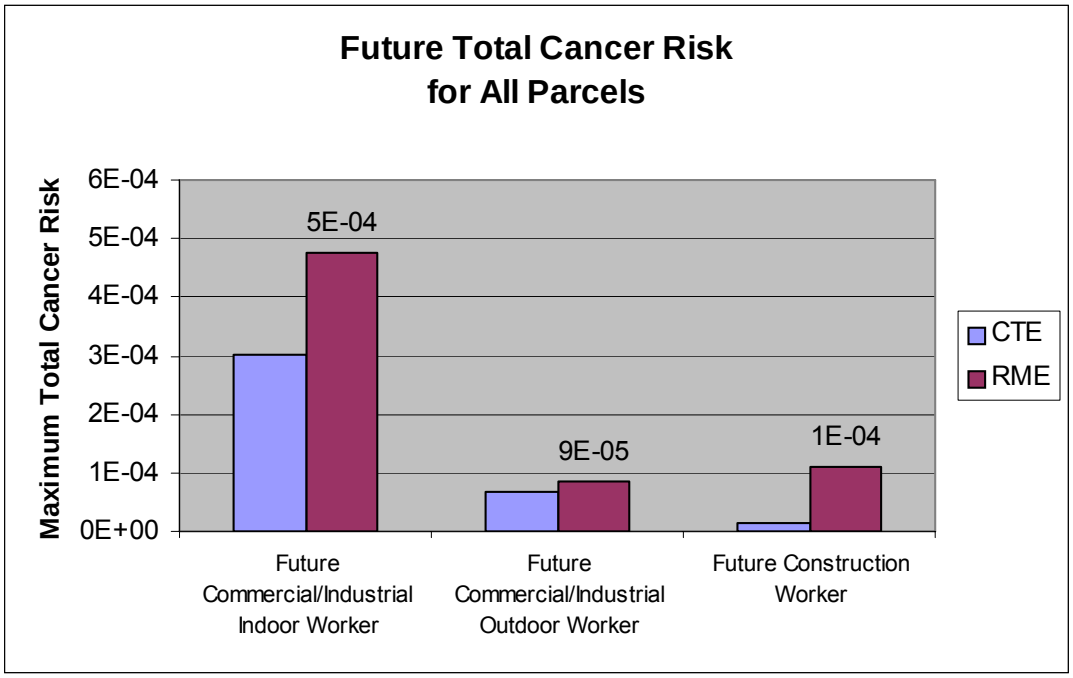
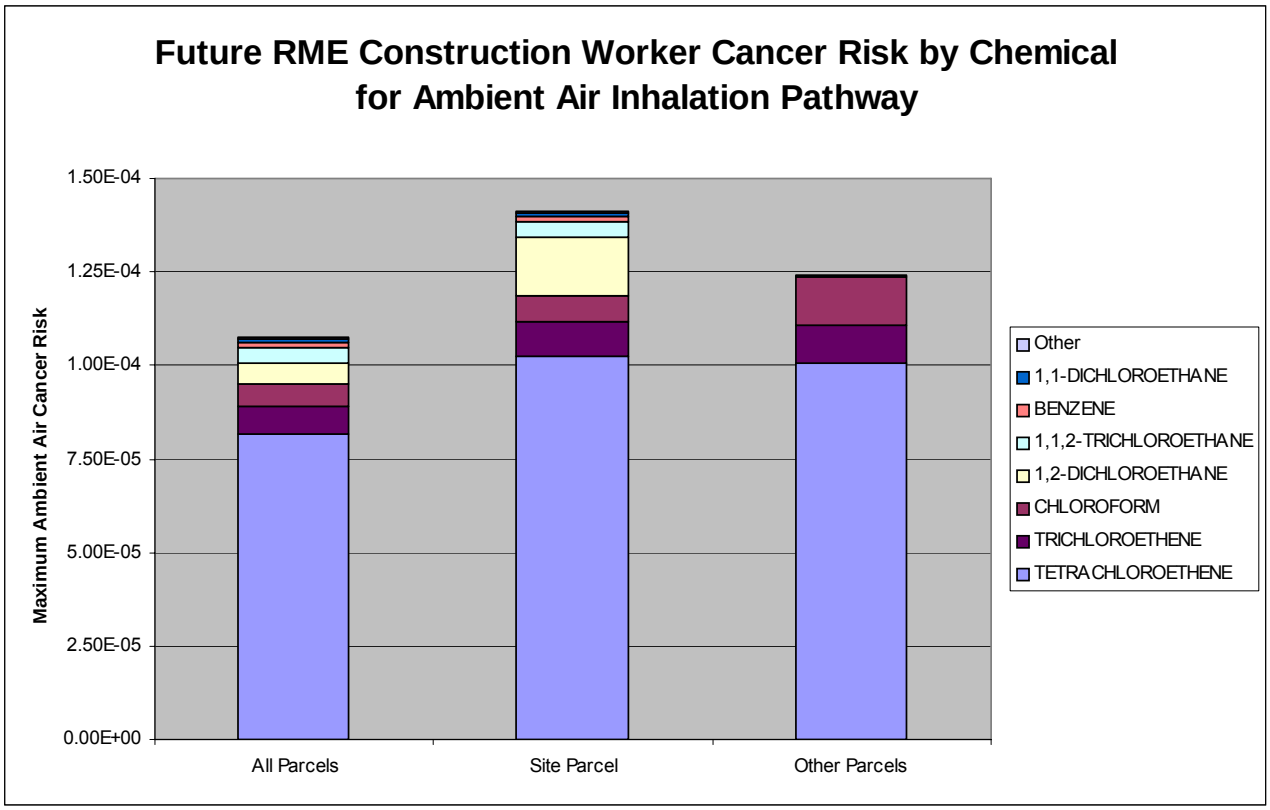


Figure 6-8
Future Commercial/Industrial Workers and Construction Workers
Total Cancer Risks



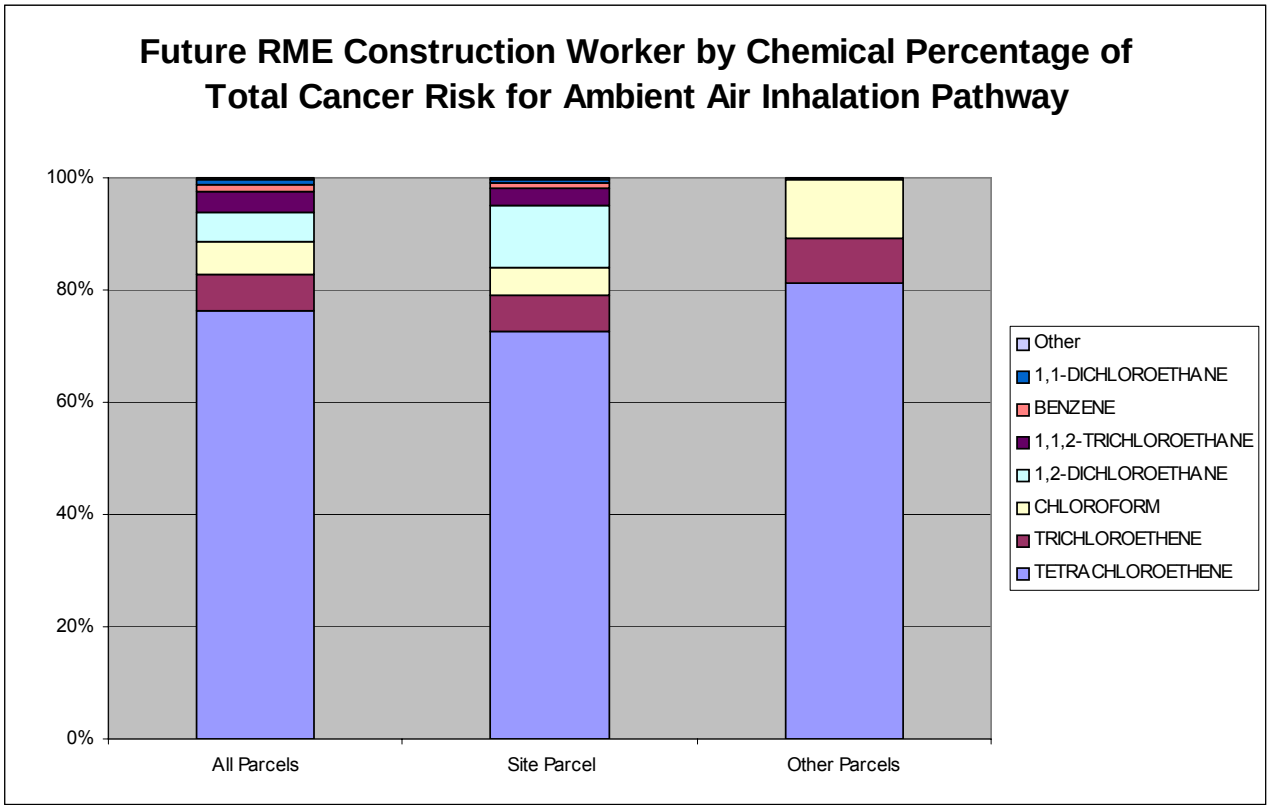


Figure 6-9
Future RME Ambient Air Cancer Risk by Chemical Construction Worker

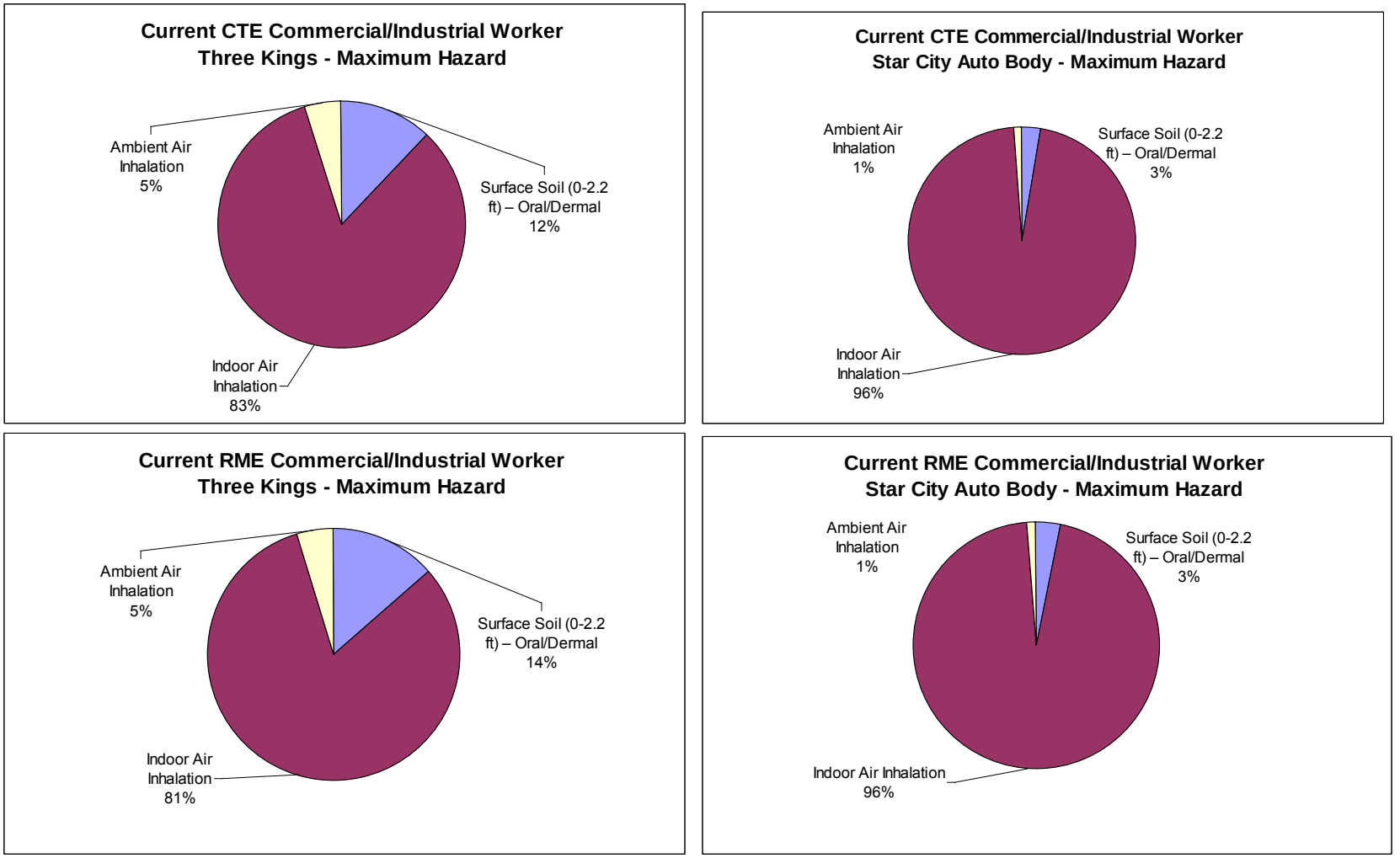


Figure 6-10
Pie Graphs of Total Hazard by Pathway
Current Commercial/Industrial Worker

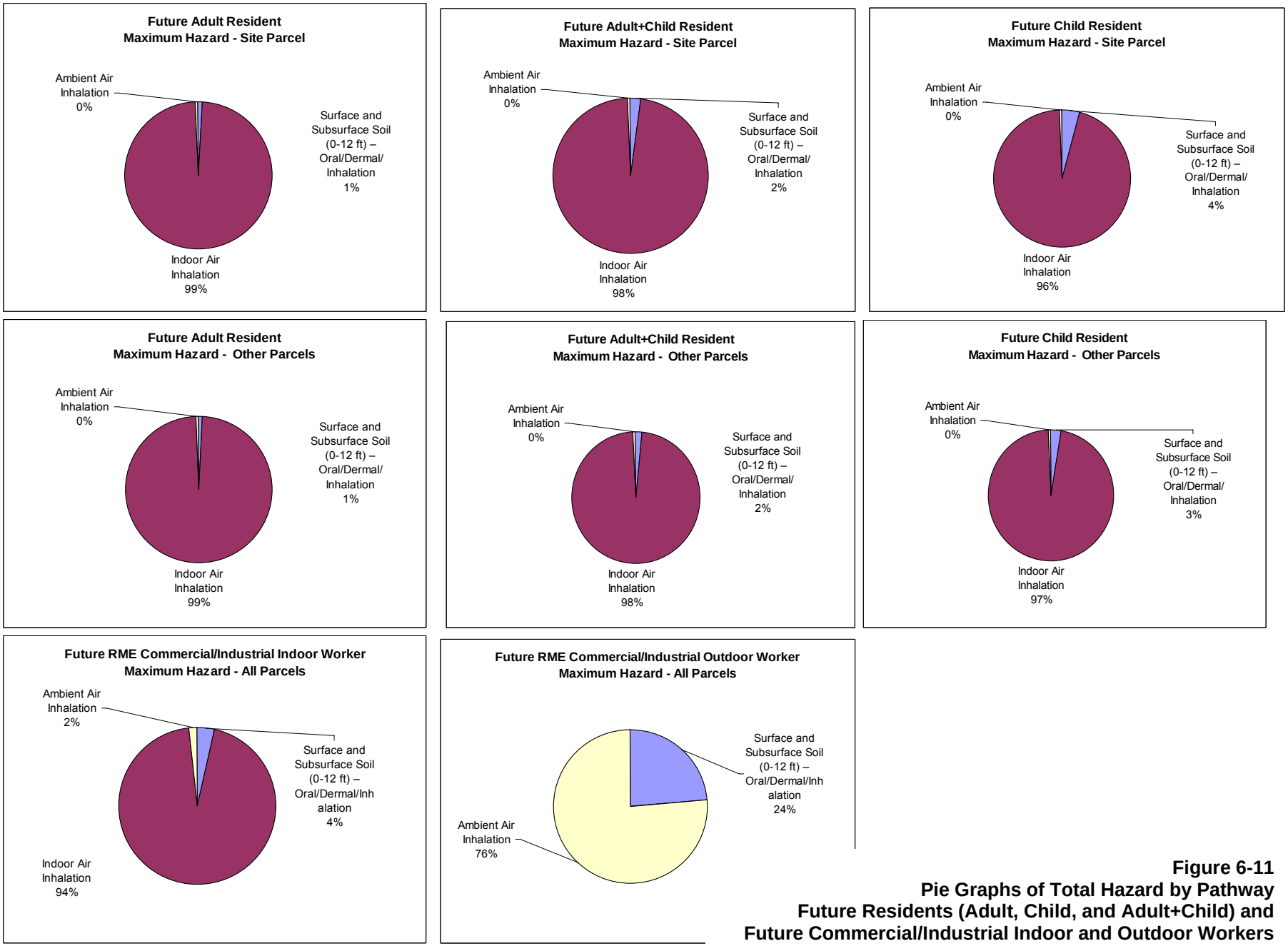


Figure 6-11
Pie Graphs of Total Hazard by Pathway
Future Residents (Adult, Child, and Adult+Child) and
Future Commercial/Industrial Indoor and Outdoor Workers

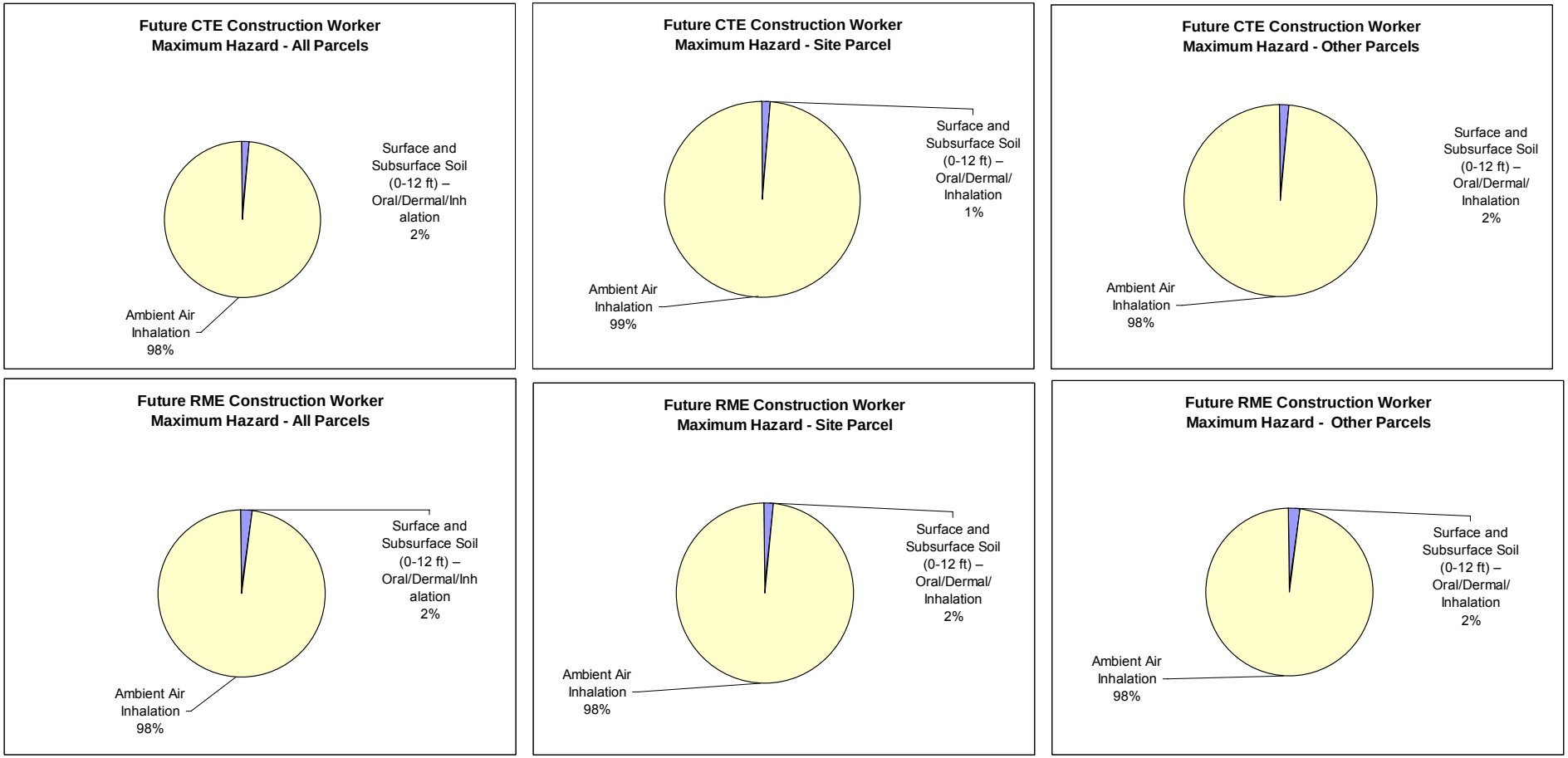
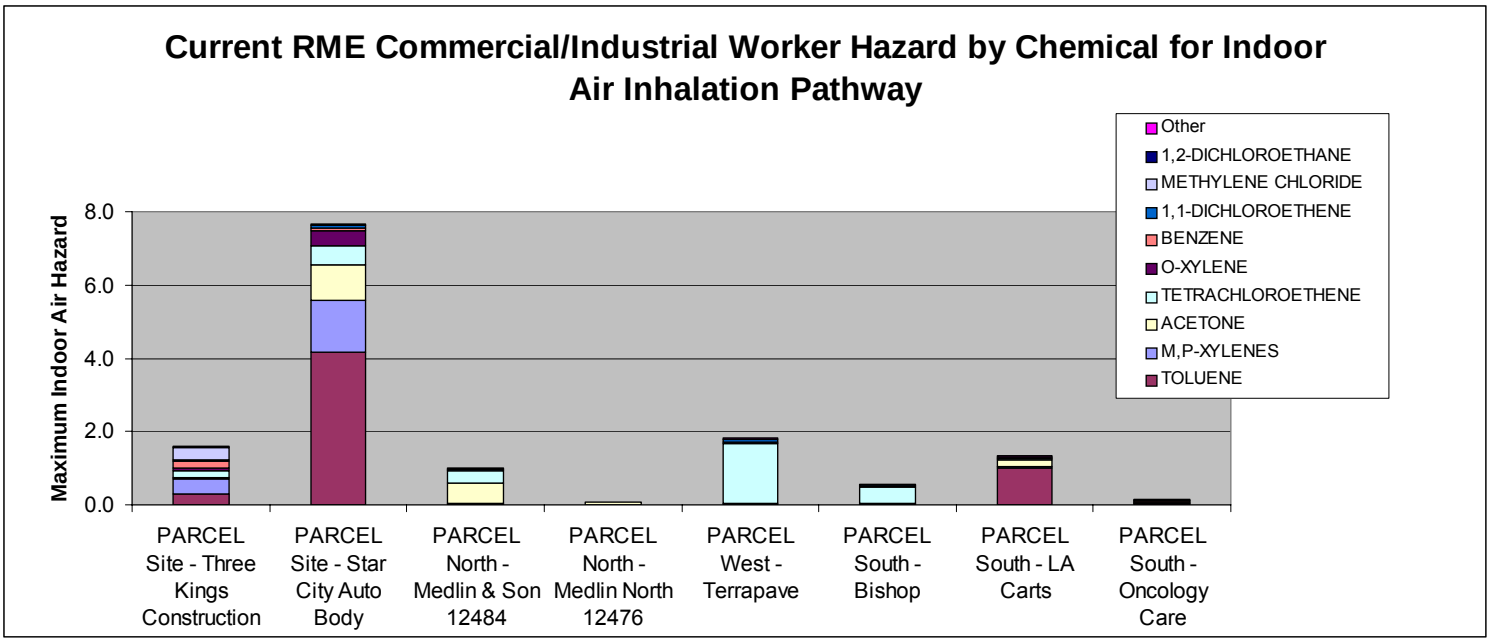
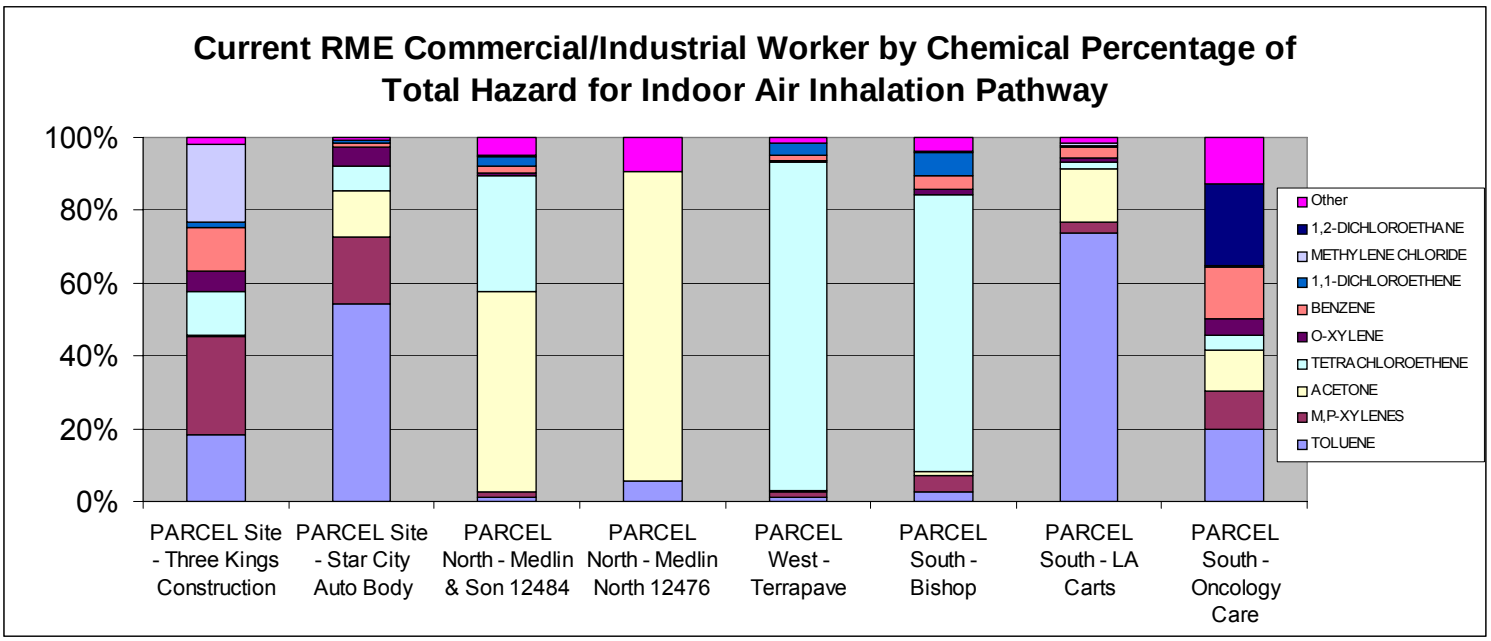


Figure 6-12
Pie Graphs of Total Hazard by Pathway
Future Construction Worker





Chemical	RME Commercial Industrial Worker Cancer Risk by Chemical for Indoor Air Inhalation Pathway							
	PARCEL Site - Three Kings Construction	**PARCEL Site - Star City Auto Body**	**PARCEL North - Medlin & Son 12484**	**PARCEL North - Medlin North 12476**	**PARCEL West - Terrapave**	**PARCEL South - Bishop**	**PARCEL South - LA Carts**	**PARCEL South - Oncology Care**
TOLUENE	18.45%	54.26%	1.26%	5.79%	0.96%	2.57%	73.91%	19.72%
M,P-XYLENES	26.7%	18.3%	1.4%		1.6%	4.5%	2.8%	10.8%
ACETONE	0.5%	12.9%	55.0%	84.7%	0.4%	1.2%	14.8%	10.9%
TETRACHLOROETHENE	12.1%	6.6%	32.0%		90.2%	76.0%	1.8%	4.4%
O-XYLENE	5.5%	5.3%	0.5%		0.6%	1.6%	1.0%	4.5%
BENZENE	11.9%	1.2%	1.9%		1.3%	3.7%	2.9%	13.9%
1,1-DICHLOROETHENE	1.5%	0.6%	2.6%		3.3%	6.4%	0.7%	0.4%
METHYLENE CHLORIDE	21.2%	0.1%	0.7%		0.1%	0.4%	0.6%	
1,2-DICHLOROETHANE								22.7%
Other	2.0%	0.7%	4.7%	9.5%	1.5%	3.7%	1.5%	12.6%
TOTAL	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**

Figure 6-13
Current RME Commercial/Industrial Worker Indoor Air Hazard by Chemical

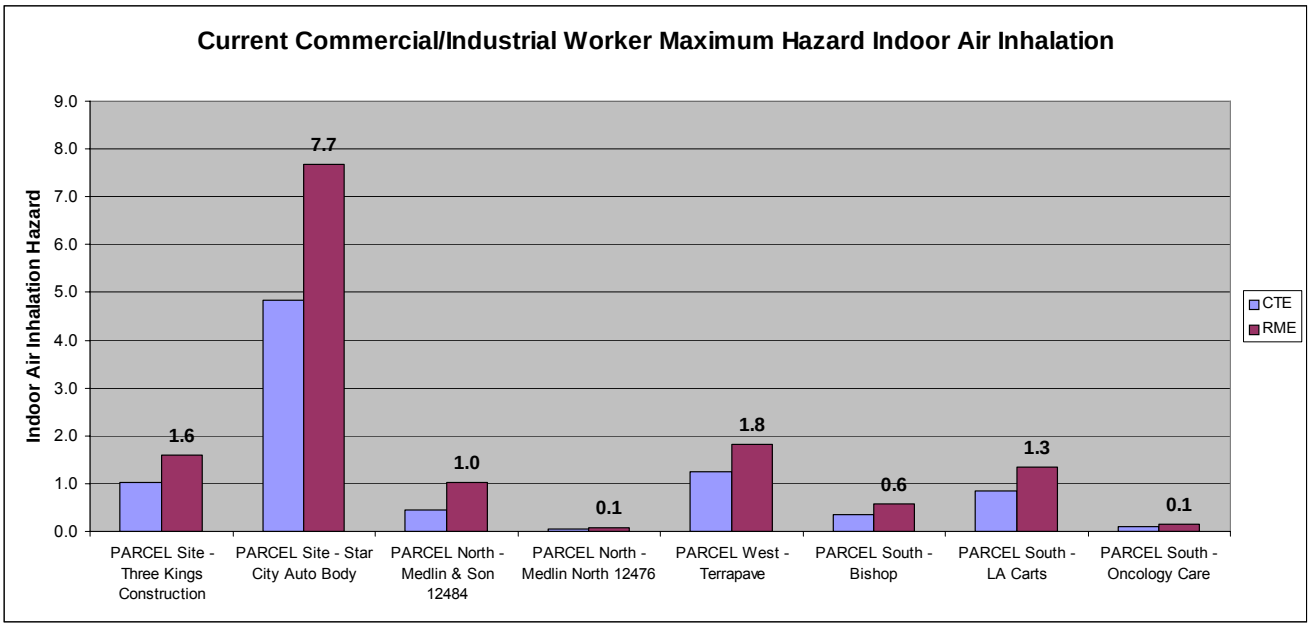


Figure 6-14
Current Commercial/Industrial Worker Maximum Indoor Air Hazard

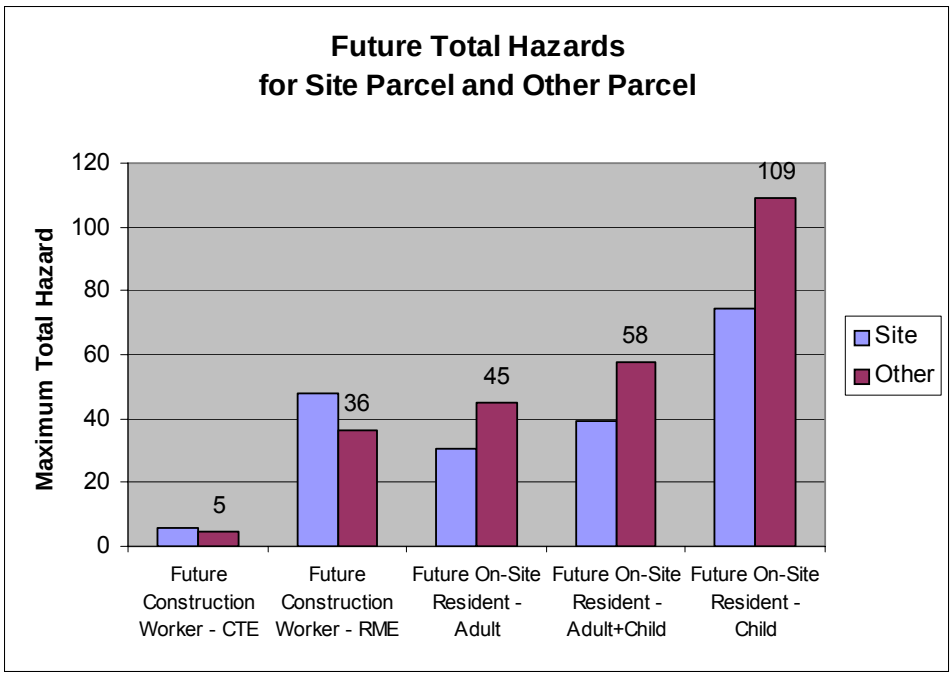
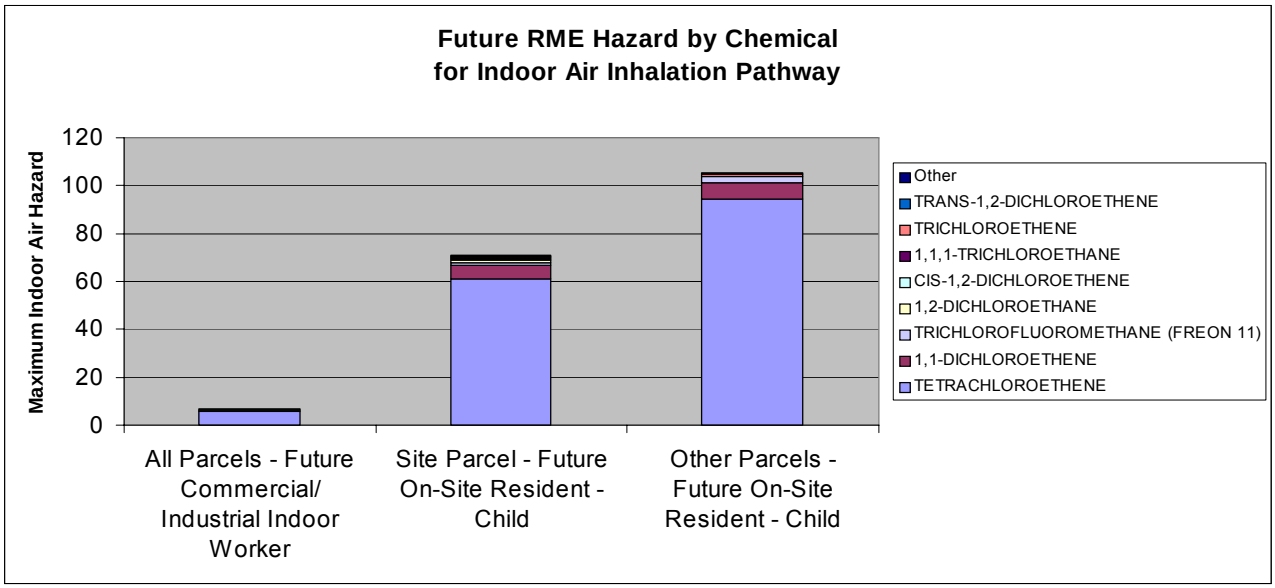
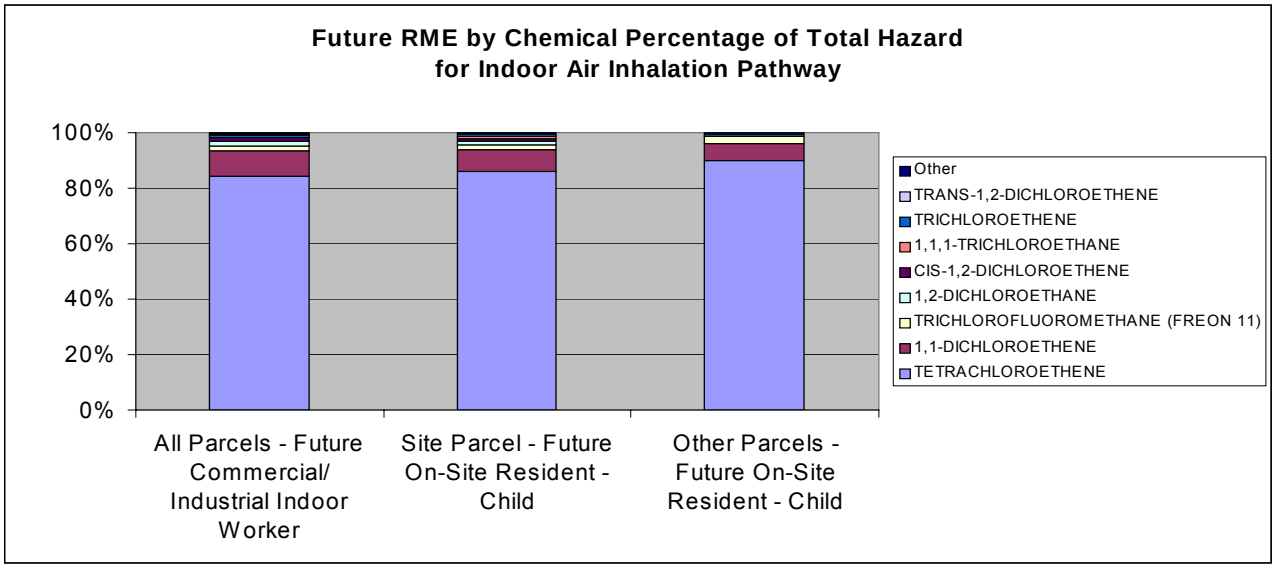


Figure 6-15
Future Residents and Construction Worker Total Hazard





Chemical	All Parcels - Future Commercial/ Industrial Indoor Worker	Site Parcel - Future On-Site Resident - Child	Other Parcels - Future On-Site Resident - Child
TETRACHLOROETHENE	84.2%	86.0%	89.8%
1,1-DICHLOROETHENE	9.3%	8.1%	6.4%
TRICHLOROFLUOROMETHANE (FREON 11)	1.9%	1.6%	2.5%
1,2-DICHLOROETHANE	1.4%	1.5%	
CIS-1,2-DICHLOROETHENE	1.3%	0.9%	
1,1,1-TRICHLOROETHANE	0.4%	0.6%	0.0%
TRICHLOROETHENE	0.8%	0.8%	1.0%
TRANS-1,2-DICHLOROETHENE	0.2%	0.3%	0.2%
Other	0.5%	0.4%	0.1%
TOTAL	100%	100%	100%

Figure 6-16
Future RME Indoor Air Hazard by Chemical
Industrial Worker and Child Resident

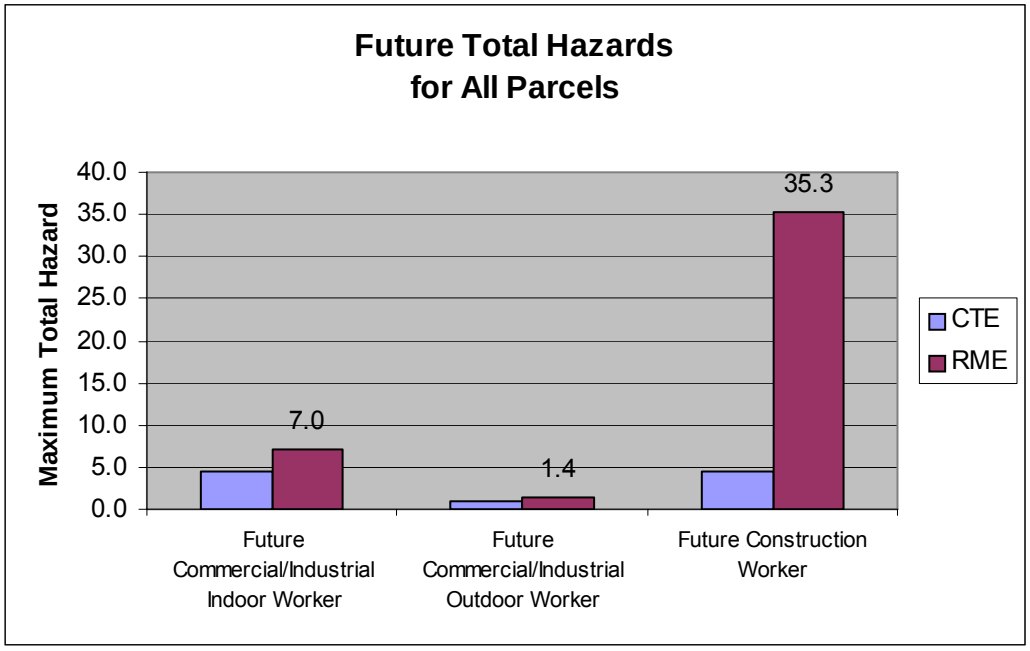
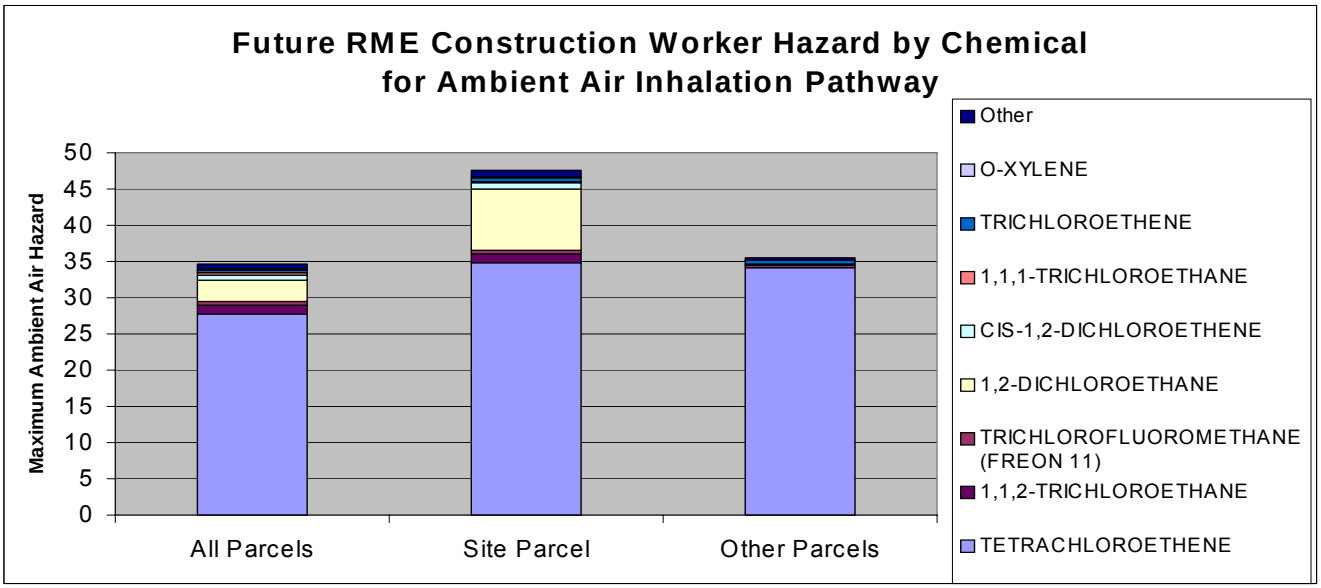
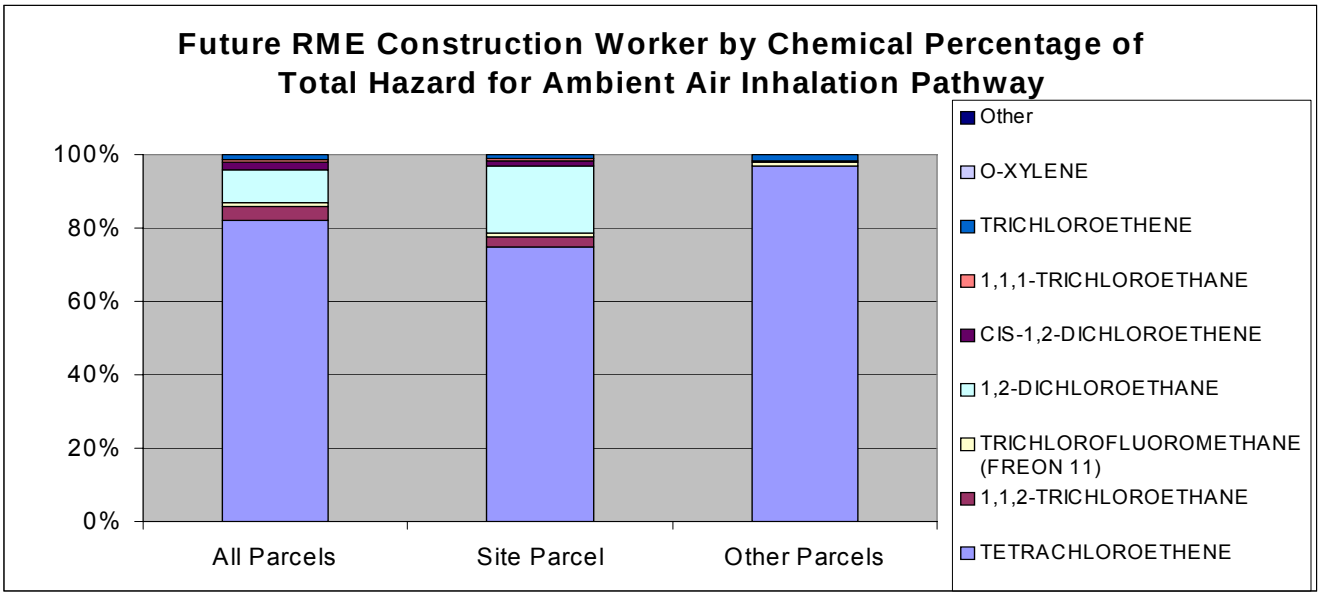


Figure 6-17
Future Commercial/Industrial Workers and Construction Workers Total Hazard





Chemical	Future Construction Worker - RME by percentage		
	All Parcels	Site Parcel	Other Parcels
TETRACHLOROETHENE	80.6%	73.5%	96.1%
1,1,2-TRICHLOROETHANE	3.6%	2.7%	
TRICHLOROFLUOROMETHANE (FREON 11)	1.2%	1.0%	1.0%
1,2-DICHLOROETHANE	8.7%	18.0%	
CIS-1,2-DICHLOROETHENE	2.0%	1.7%	0.4%
1,1,1-TRICHLOROETHANE	0.8%	0.4%	0.1%
TRICHLOROETHENE	1.2%	1.1%	1.7%
O-XYLENE	0.4%	0.4%	0.0%
Other	1.8%	1.6%	0.7%
TOTAL	100%	100%	100%

Figure 6-18
Future RME Ambient Air Hazard by Chemical Construction Worker

Table 6-1
Summary of Chronic Cancer Risks and Chronic Non-Cancer Hazards - Current Scenarios

Receptor	Exposure Pathway	PARCEL Site - Three Kings Construction				PARCEL Site - Star City Auto Body				PARCEL North - Medlin & Son 12484				PARCEL North - Medlin North 12476		PARCEL West - Terrapave				PARCEL South - Bishop				PARCEL South - LA Carts				PARCEL South - Oncology Care			
		Total Chronic Cancer Risk		Total Chronic Non-Cancer Hazard		Total Chronic Cancer Risk		Total Chronic Non-Cancer Hazard		Total Chronic Cancer Risk		Total Chronic Non-Cancer Hazard		Total Chronic Cancer Risk	Total Chronic Non-Cancer Hazard	Total Chronic Cancer Risk		Total Chronic Non-Cancer Hazard		Total Chronic Cancer Risk		Total Chronic Non-Cancer Hazard		Total Chronic Cancer Risk		Total Chronic Non-Cancer Hazard		Total Chronic Cancer Risk		Total Chronic Non-Cancer Hazard	
		Minimum	Maximum	Minimum	Maximum	Minimum	Maximum	Minimum	Maximum	Minimum	Maximum	Minimum	Maximum			Minimum	Maximum	Minimum	Maximum	Minimum	Maximum	Minimum	Maximum	Minimum	Maximum	Minimum	Maximum	Minimum	Maximum	Minimum	Maximum
Current Commercial/Industrial worker CTE	**Surface Soil to 2.2 ft bgs** – Oral/Dermal/Inhalation[3]	9.E-06	9.E-06	0.15	0.15	9.E-06	9.E-06	0.15	0.15	NA[2]	NA[2]	NA[2]	NA[2]	NA[2]	NA[2]	NA[2]	NA[2]	NA[2]	NA[2]	NA[2]	NA[2]	NA[2]	NA[2]	NA[2]	NA[2]	NA[2]	NA[2]	NA[2]	NA[2]	NA[2]	NA[2]
	Indoor Air – Inhalation Pathway(1)	*1.E-05*	*8.E-05*	*0.15*	*1.0*	*2.E-05*	*5.E-05*	*0.3*	*4.8*	*1.E-05*	*3.E-05*	*0.09*	*0.6*	*0.E+00*	*0.05*	*4.E-05*	*1.E-04*	*0.5*	*1.2*	*1.E-05*	*3.E-05*	*0.12*	*0.4*	*9.E-06*	*1.E-05*	*0.06*	*0.8*	*1.E-05*	*1.E-05*	*0.09*	*0.09*
	Ambient Air – Inhalation Pathway	*1.E-06*	*1.E-06*	*0.06*	*0.1*	*1.E-06*	*1.E-06*	*0.1*	*0.1*	NA[2]	NA[2]	NA[2]	NA[2]	NA[2]	NA[2]	NA[2]	NA[2]	NA[2]	NA[2]	NA[2]	NA[2]	NA[2]	NA[2]	NA[2]	NA[2]	NA[2]	NA[2]	NA[2]	NA[2]	NA[2]	NA[2]
	TOTAL	**2.E-05**	**9.E-05**	**0.4**	**1.2**	**3.E-05**	**6.E-05**	**0.5**	**5.1**	**8.E-06**	**2.E-05**	**0.05**	**0.4**	**0.E+00**	**0.05**	**4.E-05**	**1.E-04**	**0.5**	**1.2**	**1.E-05**	**3.E-05**	**0.12**	**0.4**	**9.E-06**	**1.E-05**	**0.06**	**0.8**	**1.E-05**	**1.E-05**	**0.09**	**0.09**
Current Commercial/Industrial worker RME	**Surface Soil to 2.2 ft bgs** – Oral/Dermal/Inhalation[3]	1.E-05	1.E-05	0.3	0.3	1.E-05	1.E-05	0.3	0.3	NA[2]	NA[2]	NA[2]	NA[2]	NA[2]	NA[2]	NA[2]	NA[2]	NA[2]	NA[2]	NA[2]	NA[2]	NA[2]	NA[2]	NA[2]	NA[2]	NA[2]	NA[2]	NA[2]	NA[2]	NA[2]	NA[2]
	Indoor Air – Inhalation Pathway[1]	*2.E-05*	*1.E-04*	*0.2*	*1.6*	*3.E-05*	*7.E-05*	*0.4*	*7.7*	*2.E-05*	*5.E-05*	*0.1*	*1.0*	*0.E+00*	*0.08*	*6.E-05*	*1.E-04*	*0.7*	*1.8*	*2.E-05*	*5.E-05*	*0.2*	*0.6*	*1.E-05*	*2.E-05*	*0.10*	*1.3*	*2.E-05*	*2.E-05*	*0.14*	*0.15*
	Ambient Air – Inhalation Pathway	*2.E-06*	*2.E-06*	*0.1*	*0.1*	*2.E-06*	*2.E-06*	*0.1*	*0.1*	NA[2]	NA[2]	NA[2]	NA[2]	NA[2]	NA[2]	NA[2]	NA[2]	NA[2]	NA[2]	NA[2]	NA[2]	NA[2]	NA[2]	NA[2]	NA[2]	NA[2]	NA[2]	NA[2]	NA[2]	NA[2]	NA[2]
	TOTAL	**4.E-05**	**1.E-04**	**0.6**	**2.0**	**4.E-05**	**9.E-05**	**0.8**	**8.0**	**2.E-05**	**5.E-05**	**0.1**	**1.0**	**0.E+00**	**0.08**	**6.E-05**	**1.E-04**	**0.7**	**1.8**	**2.E-05**	**5.E-05**	**0.2**	**0.6**	**1.E-05**	**2.E-05**	**0.10**	**1.3**	**2.E-05**	**2.E-05**	**0.14**	**0.15**

(1) Indoor air inhalation pathway was calculated using measured indoor air data.
(2) Soil and ambient air pathways not calculated separately for the parcels
(3) Surface soil risks and hazards for Three Kings Construction and Star City Auto Body are the same for both buildings because there is only one set of soil data for the site.
(4) Ambient air exposure concentrations calculated from measured ambient air concentrations.

Table 6-2
Summary of Chronic Cancer Risks and Chronic Non-Cancer Hazards - Future Scenarios

Receptor	Exposure Pathway	PARCEL Site - Former Omega Property				Parcels Other than the Former Omega Property				All Parcels			
		Total Chronic Cancer Risk		Total Chronic Non-Cancer Hazard		Total Chronic Cancer Risk		Total Chronic Non-Cancer Hazard		Total Chronic Cancer Risk		Total Chronic Non-Cancer Hazard	
		Minimum	Maximum	Minimum	Maximum	Minimum	Maximum	Minimum	Maximum	Minimum	Maximum	Minimum	Maximum
Future Commercial/Industrial worker Indoor Worker CTE	**Surface and Subsurface Soil to 12 ft bgs** – Oral/Dermal/Inhalation									8.E-06	8.E-06	0.14	0.14
	Indoor Air (Soil gas 5 to 6 Feet bgs) – Inhalation Pathway[1]									8.E-07	3.E-04	0.009	4.2
	Ambient Air (Soil gas 5 to 6 Feet bgs) - Inhalation Pathway									1.E-08	5.E-06	0.0002	0.07
	TOTAL									**9.E-06**	**3.E-04**	**0.15**	**4.4**
Future Commercial/Industrial worker Indoor Worker RME	**Surface and Subsurface Soil to 12 ft bgs** – Oral/Dermal/Inhalation									1.E-05	1.E-05	0.3	0.3
	Indoor Air (Soil gas 5 to 6 Feet bgs) – Inhalation Pathway[1]									1.E-06	5.E-04	0.014	7
	Ambient Air (Soil gas 5 to 6 Feet bgs) - Inhalation Pathway									2.E-08	8.E-06	0.0003	0.1
	TOTAL									**1.E-05**	**5.E-04**	**0.3**	**7.0**
Future Commercial/Industrial worker Outdoor Worker CTE	**Surface and Subsurface Soil to 12 ft bgs** – Oral/Dermal/Inhalation									1.E-05	1.E-05	0.2	0.2
	Ambient Air (Soil gas 5 to 6 Feet bgs) - Inhalation Pathway									2.E-07	6.E-05	0.002	0.8
	TOTAL									**1.E-05**	**7.E-05**	**0.2**	**1.0**
Future Commercial/Industrial worker Outdoor Worker RME	**Surface and Subsurface Soil to 12 ft bgs** – Oral/Dermal/Inhalation									1.E-05	1.E-05	0.3	0.3
	Ambient Air (Soil gas 5 to 6 Feet bgs) - Inhalation Pathway									2.E-07	7.E-05	0.002	1.1
	TOTAL									**1.E-05**	**9.E-05**	**0.3**	**1.4**
Future Construction Worker CTE	**Surface and Subsurface Soil to 12 ft bgs** – Oral /Dermal/Inhalation of Fugitive Dust	2.E-07	2.E-07	0.08	0.08	2.E-07	2.E-07	0.08	0.08	2.E-07	2.E-07	0.08	0.08
	Ambient Air (Soil gas 5 to 12 Feet bgs) - Inhalation Pathway - in Excavation[4]	2.E-07	2.E-05	0.05	5.9	1.E-08	2.E-05	0.010	4.4	2.E-07	1.E-05	0.05	4.3
	TOTAL	**4.E-07**	**2.E-05**	**0.13**	**6.0**	**3.E-07**	**2.E-05**	**0.09**	**4.5**	**4.E-07**	**1.E-05**	**0.12**	**4.4**
Future Construction Worker RME	**Surface and Subsurface Soil to 12 ft bgs** – Oral /Dermal/Inhalation of Fugitive Dust	1.E-06	1.E-06	0.8	0.8	1.E-06	1.E-06	0.8	0.8	1.E-06	1.E-06	0.8	0.8
	Ambient Air (Soil gas 5 to 12 Feet bgs) - Inhalation Pathway - in Excavation[4]	1.E-06	1.E-04	0.4	47	1.E-07	1.E-04	0.08	35	1.E-06	1.E-04	0.4	34
	TOTAL	**3.E-06**	**1.E-04**	**1.2**	**48**	**1.E-06**	**1.E-04**	**0.9**	**36**	**2.E-06**	**1.E-04**	**1.2**	**35**
Future On-Site Resident [3] RME - Adult	**Surface and Subsurface Soil to 12 ft bgs** – Oral /Dermal/Inhalation	2.E-05	2.E-05	0.3	0.3	2.E-05	2.E-05	0.3	0.3				
	Indoor Air (Soil gas 5 to 6 Feet bgs) – Inhalation Pathway[5]	3.E-05	3.E-03	0.4	30	3.E-06	4.E-03	0.08	45				
	Ambient Air (Soil gas 5 to 6 Feet bgs) - Inhalation Pathway	2.E-07	1.E-05	0.002	0.2	2.E-08	2.E-05	0.0004	0.2				
	TOTAL	**5.E-05**	**3.E-03**	**0.7**	**30**	**2.E-05**	**4.E-03**	**0.4**	**45**				
Future On-Site Resident [3] RME - Adult+Child	**Surface and Subsurface Soil to 12 ft bgs** – Oral /Dermal/Inhalation	4.E-05	4.E-05	0.9	0.9	4.E-05	4.E-05	0.9	0.9				
	Indoor Air (Soil gas 5 to 6 Feet bgs) – Inhalation Pathway[5]	4.E-05	3.E-03	0.5	38	4.E-06	5.E-03	0.11	57				
	Ambient Air (Soil gas 5 to 6 Feet bgs) - Inhalation Pathway	2.E-07	2.E-05	0.002	0.2	2.E-08	2.E-05	0.0005	0.3				
	TOTAL	**8.E-05**	**3.E-03**	**1.4**	**39**	**4.E-05**	**5.E-03**	**1.0**	**58**				
Future On-Site Resident [3] RME - Child	**Surface and Subsurface Soil to 12 ft bgs** – Oral /Dermal, Inhalation	3.E-05	3.E-05	3.2	3.2	3.E-05	3.E-05	3.2	3.2				
	Indoor Air (Soil gas 5 to 6 Feet bgs) – Inhalation Pathway[5]	2.E-05	1.E-03	0.9	71	1.E-06	2.E-03	0.20	105				
	Ambient Air (Soil gas 5 to 6 Feet bgs) - Inhalation Pathway	8.E-08	6.E-06	0.005	0.4	7.E-09	9.E-06	0.0010	0.5				
	TOTAL	**4.E-05**	**1.E-03**	**4.1**	**74**	**3.E-05**	**2.E-03**	**3.4**	**109**				

(3) Future residential development is unlikely for any area of the site. Calculations were only conducted on-site to provide a representative calculation for potential residential exposure.
(4) Ambient air exposure concentrations calculated from soil gas concentrations.
(5) Indoor air pathway was calculated using soil gas data since future buildings are not expected to have the same characteristics as the current building where indoor air samples were measured.
(6) For future scenarios there is only one set of soil data for on-site.

Table 6-3
Summary of Carcinogenic and Non-Carcinogenic HBRGs for COPCs
Omega Chemical Site - Whittier, California

Scenario Timeframe:	Future		
Receptor Population:	Industrial Worker and Construction Worker	Target Risk	1.0E-06
Receptor:	Adult	Target Hazard	1.0E+00

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Units	HBRG for Exposure Point					HBRG For Original Medium		Comparison of Calculated HBRG to Existing Screening Level[1]	
					Industrial CTE	Industrial RME	Construction CTE	Construction RME	Receptor Minimum	Value	Units	Screening Level	Notes
Soil	Soil	Soil	1,4-DIOXANE	mg/kg	1.6E+02	1.1E+02	NA	NA	1.1E+02	1.1E+02	mg/kg	1.57E+02	PRG less stringent
			BENZO(A)ANTHRACENE	mg/kg	2.8E+00	2.4E+00	NA	NA	2.4E+00	2.4E+00	mg/kg	2.11E+00	OK
			BENZO(A)PYRENE	mg/kg	2.8E-01	2.4E-01	7.2E+00	1.8E+00	2.4E-01	2.4E-01	mg/kg	2.11E-01	OK
			BENZO(B)FLUORANTHENE	mg/kg	2.8E+00	2.4E+00	NA	NA	2.4E+00	2.4E+00	mg/kg	2.11E+00	OK
			BIS(2-ETHYLHEXYL)PHTHALATE	mg/kg	3.1E+02	2.0E+02	NA	NA	2.0E+02	2.0E+02	mg/kg	1.23E+02	OK
			CHRYSENE	mg/kg	2.8E+01	2.4E+01	NA	NA	2.4E+01	2.4E+01	mg/kg	2.11E+02	PRG less stringent
			DIELDRIN	mg/kg	2.7E-01	1.8E-01	NA	NA	1.8E-01	1.8E-01	mg/kg	1.08E-01	OK
			IRON	mg/kg	NA	NA	1.3E+06	9.3E+04	9.3E+04	9.3E+04	mg/kg	1.00E+05	PRG less stringent
			LEAD	mg/kg	6.7E+02	3.4E+02	NA	NA	3.4E+02	3.4E+02	mg/kg	8.00E+02	PRG less stringent
			PCB-1254 (AROCLOR 1254)	mg/kg	6.2E-01	5.7E-01	1.6E+01	4.3E+00	5.7E-01	5.7E-01	mg/kg	7.44E-01	PRG less stringent
			POLYCHLORINATED BI PHENYLS, TOTAL	mg/kg	6.2E-01	5.7E-01	1.6E+01	4.3E+00	5.7E-01	5.7E-01	mg/kg	2.12E+01	PRG less stringent
			TETRACHLOROETHENE	mg/kg	1.1E+01	5.3E+00	5.5E+02	4.0E+01	5.3E+00	5.3E+00	mg/kg	1.31E+00	OK
			VANADIUM	mg/kg	NA	NA	4.3E+03	3.1E+02	3.1E+02	3.1E+02	mg/kg	1.02E+03	PRG less stringent
Soil gas 5-6 ft	Indoor Air	Indoor Air	1,1-DICHLOROETHANE	ug/m^3	5.2E+00	3.3E+00	NA	NA	3.3E+00	3.3E+00	ug/m^3	---	No CHHSL
			1,1-DICHLOROETHENE	ug/m^3	6.1E+02	3.8E+02	NA	NA	3.8E+02	3.8E+02	ug/m^3	---	No CHHSL
			1,2-DICHLOROETHANE	ug/m^3	3.3E-01	2.1E-01	NA	NA	2.1E-01	2.1E-01	ug/m^3	1.95E-01	OK
			BENZENE	ug/m^3	3.0E-01	1.9E-01	NA	NA	1.9E-01	1.9E-01	ug/m^3	1.41E-01	OK
			CARBON TETRACHLORIDE	ug/m^3	2.0E-01	1.3E-01	NA	NA	1.3E-01	1.3E-01	ug/m^3	9.73E-02	OK
			CHLOROFORM	ug/m^3	3.7E-01	2.3E-01	NA	NA	2.3E-01	2.3E-01	ug/m^3	---	No CHHSL
			TETRACHLOROETHENE	ug/m^3	1.4E+00	9.1E-01	NA	NA	9.1E-01	9.1E-01	ug/m^3	6.93E-01	OK
			TRICHLOROETHENE	ug/m^3	4.3E+00	2.7E+00	NA	NA	2.7E+00	2.7E+00	ug/m^3	2.04E+00	OK
			TRICHLOROFLUOROMETHANE (FREON 11)	ug/m^3	2.1E+03	1.3E+03	NA	NA	1.3E+03	1.3E+03	ug/m^3	---	No CHHSL

Table 6-3
Summary of Carcinogenic and Non-Carcinogenic HBRGs for COPCs
Omega Chemical Site - Whittier, California

Scenario Timeframe:	Future		
Receptor Population:	Industrial Worker and Construction Worker	Target Risk	1.0E-06
Receptor:	Adult	Target Hazard	1.0E+00

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Units	HBRG for Exposure Point					HBRG For Original Medium		Comparison of Calculated HBRG to Existing Screening Level[1]	
					Industrial CTE	Industrial RME	Construction CTE	Construction RME	Receptor Minimum	Value	Units	Screening Level	Notes
Soil gas 5-30 ft	Ambient Air	Ambient Air	1,1,1-TRICHLOROETHANE	ug/m^3	NA	NA	4.8E+00	6.0E-01	6.0E-01	6.0E-01	ug/m^3	2.30E+03	PRG less stringent
			1,1,2-TRICHLOROETHANE	ug/m^3	NA	NA	1.7E-02	2.1E-03	2.1E-03	2.1E-03	ug/m^3	1.20E-01	PRG less stringent
			1,1-DICHLOROETHANE	ug/m^3	NA	NA	2.1E-01	2.6E-02	2.6E-02	2.6E-02	ug/m^3	1.18E+00	PRG less stringent
			1,2-DICHLOROETHANE	ug/m^3	NA	NA	1.3E-02	1.6E-03	1.6E-03	1.6E-03	ug/m^3	7.39E-02	PRG less stringent
			BENZENE	ug/m^3	NA	NA	1.2E-02	1.5E-03	1.5E-03	1.5E-03	ug/m^3	2.49E-01	PRG less stringent
			BROMODICHLOROMETHANE	ug/m^3	NA	NA	9.2E-03	1.1E-03	1.1E-03	1.1E-03	ug/m^3	1.08E-01	PRG less stringent
			CARBON TETRACHLORIDE	ug/m^3	NA	NA	7.9E-03	9.9E-04	9.9E-04	9.9E-04	ug/m^3	1.28E-01	PRG less stringent
			CHLOROFORM	ug/m^3	NA	NA	3.8E-02	4.8E-03	4.8E-03	4.8E-03	ug/m^3	3.54E-01	PRG less stringent
			CIS-1,2-DICHLOROETHENE	ug/m^3	NA	NA	1.7E-01	2.1E-02	2.1E-02	2.1E-02	ug/m^3	3.65E+01	PRG less stringent
			O-XYLENE	ug/m^3	NA	NA	3.4E+00	4.3E-01	4.3E-01	4.3E-01	ug/m^3	---	No PRG
			TETRACHLOROETHENE	ug/m^3	NA	NA	2.2E-03	2.8E-04	2.8E-04	2.8E-04	ug/m^3	3.20E-01	PRG less stringent
			TRANS-1,2-DICHLOROETHENE	ug/m^3	NA	NA	3.4E-01	4.3E-02	4.3E-02	4.3E-02	ug/m^3	7.30E+01	PRG less stringent
			TRICHLOROETHENE	ug/m^3	NA	NA	5.1E-03	6.4E-04	6.4E-04	6.4E-04	ug/m^3	9.61E-01	PRG less stringent
			TRICHLOROFLUOROMETHANE (FREON 11)	ug/m^3	NA	NA	5.1E+00	6.4E-01	6.4E-01	6.4E-01	ug/m^3	7.30E+02	PRG less stringent

NA: Not applicable, not a COPC for the pathway or the receptor scenario
OK: indicates that HBRG is higher than screening level
HBRG: Health based risk goal
CHHSL: California Human Health Screening Level
PRG: Preliminary Remediation Goal
ug/m^3: microgram per cubic meter.

(1) Screening Levels were as follows:
Indoor air screening levels are CalEPA CHHSLs Indoor Air Screening Levels for Human Health Commercial/Industrial Use (EPA 2005).
Soil screening levels are EPA's Region 9 Preliminary Remediation Goals (PRGs) for industrial soil (EPA 2004c)

Table 6-4
Comparison of Carcinogenic and Non-Carcinogenic HBRGs for COPCs to Building Maximum Detections
Omega Chemical Site - Whittier, California

Scenario Timeframe:	Current/Future
Receptor Population:	Industrial Worker and Construction Worker
Receptor:	Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	HBRG For Original Medium Value	HBRG For Original Medium Units	Maximum Detections by Building[1]: Site Parcel 3 Kings	Site Parcel Star City	North Parcel Medlin & Sons 12484	North Parcel Medlin & Sons 12476	West Parcel Terrapave	South Parcel Bishop	South Parcel LA Carts	South Parcel Oncology Care
Soil	Soil	Soil	1,4-DIOXANE	1.1E+02	mg/kg	2.8E+01		NA	NA	NA	NA	NA	NA
			BENZO(A)ANTHRACENE	2.4E+00	mg/kg	2.4E+00		NA	NA	NA	NA	NA	NA
			BENZO(A)PYRENE	2.4E-01	mg/kg	**1.6E+00**		NA	NA	NA	NA	NA	NA
			BENZO(B)FLUORANTHENE	2.4E+00	mg/kg	9.1E-01		NA	NA	NA	NA	NA	NA
			BIS(2-ETHYLHEXYL)PHTHALATE	2.0E+02	mg/kg	5.1E+01		NA	NA	NA	NA	NA	NA
			CHRYSENE	2.4E+01	mg/kg	6.0E+00		NA	NA	NA	NA	NA	NA
			DIELDRIN	1.8E-01	mg/kg	5.0E-02		NA	NA	NA	NA	NA	NA
			IRON	9.3E+04	mg/kg	2.3E+04		NA	NA	NA	NA	NA	NA
			LEAD	3.4E+02	mg/kg	**8.9E+02**		NA	NA	NA	NA	NA	NA
			PCB-1254 (AROCLOR 1254)	5.7E-01	mg/kg	5.0E-01		NA	NA	NA	NA	NA	NA
			POLYCHLORINATED BI PHENYLS	5.7E-01	mg/kg	5.0E-01		NA	NA	NA	NA	NA	NA
			TETRACHLOROETHENE	5.3E+00	mg/kg	4.3E+00		NA	NA	NA	NA	NA	NA
			VANADIUM	3.1E+02	mg/kg	7.1E+01		NA	NA	NA	NA	NA	NA
Soil gas 5-6 ft	Indoor Air	Indoor Air	1,1-DICHLOROETHANE	3.3E+00	ug/m^3	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected
			1,1-DICHLOROETHENE	3.8E+02	ug/m^3	9.2E+00	1.8E+01	1.0E+01	Not Detected	2.3E+01	1.4E+01	3.6E+00	2.3E-01
			1,2-DICHLOROETHANE	2.1E-01	ug/m^3	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	3.2E-01
			BENZENE	1.9E-01	ug/m^3	**1.1E+01**	**5.3E+00**	**1.1E+00**	Not Detected	**1.4E+00**	**1.2E+00**	**2.2E+00**	**1.2E+00**
			CARBON TETRACHLORIDE	1.3E-01	ug/m^3	**6.5E-01**	**6.7E-01**	**1.3E+00**	Not Detected	**6.7E-01**	**5.8E-01**	**5.2E-01**	**5.2E-01**
			CHLOROFORM	2.3E-01	ug/m^3	**2.5E-01**	1.9E-01	**3.2E-01**	Not Detected	**2.4E-01**	1.8E-01	**3.7E-01**	**6.6E-01**
			TETRACHLOROETHENE	9.1E-01	ug/m^3	**1.3E+01**	**3.4E+01**	**2.2E+01**	Not Detected	**1.1E+02**	**2.9E+01**	**1.6E+00**	4.4E-01
			TRICHLOROETHENE	2.7E+00	ug/m^3	**3.3E+00**	**6.5E+00**	**1.4E+01**	Not Detected	**4.4E+00**	1.5E+00	1.2E+00	Not Detected
			TRICHLOROFLUOROMETHANE (	1.3E+03	ug/m^3	5.9E+00	1.4E+01	1.2E+01	1.6E+00	7.0E+00	3.7E+00	3.2E+00	1.8E+00
Soil gas 5-30 ft	Ambient Air	Ambient Air	1,1,1-TRICHLOROETHANE	6.0E-01	ug/m^3	**1.1E+00**							
			1,1,2-TRICHLOROETHANE	2.1E-03	ug/m^3	Not Detected							
			1,1-DICHLOROETHANE	2.6E-02	ug/m^3	Not Detected							
			1,2-DICHLOROETHANE	1.6E-03	ug/m^3	Not Detected							
			BENZENE	1.5E-03	ug/m^3	**1.1E+00**							
			BROMODICHLOROMETHANE	1.1E-03	ug/m^3	Not Detected							
			CARBON TETRACHLORIDE	9.9E-04	ug/m^3	**6.3E-01**							
			CHLOROFORM	4.8E-03	ug/m^3	Not Detected							
			CIS-1,2-DICHLOROETHENE	2.1E-02	ug/m^3	Not Detected							
			O-XYLENE	4.3E-01	ug/m^3	**1.2E+00**							
			TETRACHLOROETHENE	2.8E-04	ug/m^3	**1.8E+00**							
			TRANS-1,2-DICHLOROETHENE	4.3E-02	ug/m^3	Not Detected							
			TRICHLOROETHENE	6.4E-04	ug/m^3	**1.1E+00**							
			TRICHLOROFLUOROMETHANE (	6.4E-01	ug/m^3	**2.0E+00**							

NA: Not applicable
HBRG: Health based risk goal
ug/m^3: microgram per cubic meter
mg/kg: milligram per kilogram

Values in **Bold** exceed their corresponding HBRG
1: Maximum detections shown for soil are for 0-12 feet bgs

Table 6-5
Comparison of Attenuation Factors for Primary Site Constituents
Omega Chemical Site - Whittier, California

Parcel	Compound	Soil Gas (6 feet) ($\mu g/m^3$)		Indoor Air ($\mu g/m^3$)		Attenuation Factor (α_{SG} = IA/SG)		
		Minimum	Maximum	Minimum	Maximum	Minimum	Maximum	Average
North	PCE	379591	2100000	4.3	22	2.05E-06	5.80E-05	7.16E-06
	TCE	139672	470000	2.3	14	4.89E-06	1.00E-04	1.79E-05
	1,1-DCA	1052	1052	ND	ND	NC	NC	NC
	Benzene	ND	ND	0.91	1.1	NC	NC	NC
	Freon 11	840000	1000000	1.6	12	1.60E-06	1.43E-05	7.92E-06
South	PCE	1200	88119	0.24	29	2.72E-06	2.42E-02	2.69E-04
	TCE	340	41901	0.44	1.5	1.05E-05	4.41E-03	5.24E-05
	1,1-DCA	ND	ND	ND	ND	NC	NC	NC
	Benzene	16	16	1.1	2.2	6.88E-02	1.38E-01	8.55E-02
	Freon 11	920	528029	1.5	3.7	2.84E-06	4.02E-03	1.36E-05
West	PCE	430000	1600000	39	110	2.44E-05	2.56E-04	7.24E-05
	TCE	24000	86000	1.6	4.4	1.86E-05	1.83E-04	5.32E-05
	1,1-DCA	ND	ND	ND	ND	NC	NC	NC
	Benzene	ND	ND	1.1	1.4	NC	NC	NC
	Freon 11	1400	4100	0.18	0.2	4.39E-05	1.43E-04	4.95E-05
Site	PCE	16000	3400000	1	34	2.94E-07	2.13E-03	1.25E-05
	TCE	3100	450000	0.25	6.5	5.56E-07	2.10E-03	2.16E-05
	1,1-DCA	36	110000	ND	ND	NC	NC	NC
	Benzene	44	2100	2.6	11	1.24E-03	2.50E-01	8.57E-03
	Freon 11	4300	790000	2	14	2.53E-06	3.26E-03	2.39E-05

ug/m^3: microgram per cubic meter

Section 7
Uncertainties

7.1 Uncertainties in the Risk Assessment Process

A degree of uncertainty is associated with all phases of a risk assessment. This section describes the potential impact of uncertainties associated with the database, exposure assumptions, and toxicity assessment on the final step of the risk assessment and risk characterization. In addition, uncertainties inherent in risk characterization are identified and discussed.

7.2 Uncertainties in the Database

Site data appear to provide an adequate characterization of current conditions at the site. Numerous samples were collected across the site for all media, and in many cases sampling locations were biased towards contaminated (or formerly contaminated) areas. That is, much of the site characterization effort focused on and near known source/release areas. Moreover, more than one round of sampling was completed for each media, reducing any concerns with taking a "snap shot" of site conditions that was not representative of typical conditions. This concern is particularly relevant to soil gas and indoor air concentrations which could theoretically vary considerably over time.

Overall, available data for the site can be considered representative, or somewhat biased toward areas of contamination. COPC selection based on these data is likely to include chemicals that present little risk rather than exclude chemicals that may be of concern. Risk assessment based on available data can be used with confidence to produce a conservative (protective) evaluation of potential human health risks.

7.3 Uncertainties with Exposure Assessment

Methods used in this risk assessment are conservative; methods are used that are more likely to overestimate than underestimate possible health risks. For example, risks and hazards are calculated for individuals that are likely to be exposed at locations where COPC concentrations are predicted to be highest. Further, individuals are assumed to be exposed for almost all days of the year and for many years to maximize estimates of possible exposure. Resulting cancer risk estimates represent upper-range predictions of exposure, and therefore health risk, which may be associated with living or working on the site. By protecting hypothetical individuals that receive the highest exposures (i.e., people living at or working at locations for which the highest emissions are predicted), the risk assessment will also be protective for actual members of the population that are not as highly exposed.

Potential risks and hazards associated with vapor intrusion under current conditions were considered on a parcel-by-parcel basis, using data from indoor air sampling for existing buildings. These estimates allow better visualization of potential site-impacts at the Omega Site and at surrounding properties, as well as providing an indication of possible current Site-related health risk, if any. This approach eliminates the

possibility that combining data within a larger exposure area (e.g. the Omega Site and all surrounding parcels) dilute out parcels with high and low potential for vapor intrusion.

7.3.1 Exposure Populations

Oncology Care Medical Associates is located in the South parcel, at the northeast corner of Putnam Street and Washington Boulevard. It is a 3,720 square foot, U-shaped, one level building, with an exterior paved parking lot. The building has a reception/waiting area in the front, with offices, examination rooms, a medicine storage/mixing room, and treatment room occupying the remainder of the building. This facility serves as an outpatient medical facility where patients receive oncology treatment. The chemical inventory of Oncology Care only noted several medications and an obvious odor of isopropyl alcohol, which is used for surface disinfecting throughout the facility. The HVAC evaluation revealed three AC units on the roof. The units appeared to be fairly new, and did have intakes allowing outside air to be drawn into the building. The medicine storage/mixing room contained two fume hoods for mixing medicines. The larger fume hood apparently discharges fumes from the top of the unit to the indoor air

Oncology patients are likely to have suppressed immune systems due to chemotherapy or radiology. As such, they are a potentially sensitive population that may be more affected by exposure to chemicals than the average healthy person. However, most oncology patients would not be attending the facility for the decades assumed in a risk assessment for a staff worker. Oncology treatment periods are usually less than a year at a time with patients going to the facility for a few hours a week depending on the course of treatment. Although some patients require more than one course of treatment or may have to return to the facility if the cancer reoccurs, their total time spent at the facility is still considerably less than a staff worker. Current workers at Oncology Care were assessed based on measured indoor air concentrations. As noted in Section 6, indoor air risks for workers at Oncology Care are 2E-05, which is within the middle of the EPA risk range.

7.3.2 Exposure Concentrations

The site is relatively small and will likely remain as single parcel; therefore, it was appropriately assessed as a single exposure unit. The same argument holds true for surrounding properties that are also relatively small and likely to remain as single parcels. Thus, separate evaluation of vapor intrusion for these parcels is also justified. Exposure point concentrations for individual is, however, subject to some uncertainty because dividing Site data by parcel reduces the size of the datasets used for EPC calculations.

Generally, 95% UCL concentrations were used as the exposure concentrations for site media. A 95% UCL is a statistic meaning that there is a 95% confidence (probability) that the concentration on the site will be at this level. For samples with non-detectable levels of a contaminant, one-half of the reporting limit is substituted when calculating the 95% UCL.

For example, PCE is the primary COPC of concern at the site. The 95% UCL for PCE in soil gas from 5 to 6 feet bgs for the Site parcel is 1,355,479µg/m^3 (199,923 ppbv) while PCE concentrations detected in the 22 indoor air samples ranged from 16,272 to 3,390,000 µg/m^3 . Only 6 of the 22 PCE detections had concentrations higher than 1,355,479µg/m^3 (199,923 ppbv) . It is unlikely that a receptor would spend all of his time (in the case of a commercial/industrial worker – 8 hours a day, 250 days a year for 25 years) standing at the location of the highest PCE detection. In such a manner, use of the 95% UCL as the exposure concentration provides a reasonable estimate of exposure.

In some cases, however, small datasets forced the use of the maximum detected concentration in indoor air as the EPC. Use of the maximum is likely overestimate possible indoor air concentrations. In these cases, additional conservatism may be included in risk and hazard estimates.

For a conservative estimate of potential health risks from soil gas for the future industrial worker and hypothetical residential scenarios, samples collected from 5 to 6 feet bgs collected from 2004 to 2006 were used to calculate the exposure concentrations for soil gas. Soil gas concentrations can vary seasonally and the availability of multiple rounds of soil gas sampling increased confidence in exposure point concentrations. Higher concentrations of some COPCs were found at greater depths bgs, but available data provide no indication that the observed vertical profile of soil gas concentrations is not representative of typical conditions at the site. That is, the profile did not change notably between sampling events. Thus, higher concentrations found below 6 feet bgs do not suggest that current modeling for vapor intrusion significantly underestimates potential risks or hazards. Soil gas samples collected between 5 and 30 feet bgs were used in the evaluation of the construction worker since construction workers may be present in excavations.

Measured indoor air data was used to represent indoor air under current scenarios. Due to the small number of samples collected in the buildings, 95% UCLs could not be calculated and maximum detected concentrations were used instead. The use of maximum concentrations to represent all exposures likely results in an overestimate of risks. Therefore, minimum detected concentrations in the buildings were also evaluated to provide the risk manager with a range of risks that could be experience by potential receptors.

7.3.3 Exposure Pathways

Risks and hazards calculated for future commercial/industrial worker soil exposure pathways assume that soil is available for contact. However, the site is currently covered by buildings and other impervious surfaces, and it is unlikely that soils would remain uncovered (i.e., bare) following redevelopment, eliminating much potential for exposure to Site soils. Therefore, risks and hazards associated with the exposure pathways of dermal contact, soil ingestion, and inhalation of particulates are ceiling estimates, and actual risks are likely to be negligible.

7.3.4 Estimates of Indoor and Ambient Air Concentrations

Indoor air concentrations for the site for current scenarios were estimated directly from measured indoor air concentrations. Indoor air concentrations are likely to vary during the course of a day and seasonally, and may be influenced by sources of VOCs inside of buildings and, conceivably, in ambient air. Variations in concentrations over the course of a day were addressed in the sampling by continuous sample collection over an 8-hour period, during typical work hours. These samples provide an overall daily average concentration, which is most appropriate for assessing chronic daily exposure. In addition, samples were taken in various work areas within each building to help ensure that vagaries of building ventilation did not produce spurious results. Thus, available data are reasonable estimates of daily exposure on sample collection days.

Seasonal variation was addressed by collecting samples on two or more occasions. Results from these separate sampling events were very similar for a given building. It is likely that available data reasonably describe likely indoor air quality for each of the buildings sampled. Risks estimated on the basis of measured indoor air concentrations probably fall into upper range of those possible for the site and surrounding parcels.

A final issue concerning indoor air measurements is that they cannot be used directly to estimate future indoor air concentrations should the site and/or surrounding parcels be redeveloped. While it is not possible to predict future indoor air concentrations, it is reasonable to assume that new buildings would be constructed following existing commercial building codes which are likely to require a vapor barrier and substantial ventilation. Moreover, new buildings would have intact buildings with few if any cracks that would facilitate vapor intrusion. Thus, vapor intrusion can be predicted to be less for new construction than is suggested by current indoor air data. Also, current indoor air data are likely to include non-site-related VOCs from building and/or ambient air. Current data therefore are likely to overestimate site-related risks and hazards.

However, over time, cracks may develop in the new foundation and holes may develop in the vapor barriers. In addition, building codes may require engineered fill to be placed under the foundation, which could be more permeable than the clay assume d to currently be in place and the loam assumed in the modeling. Therefore, it is uncertain whether current data overestimate or underestimate site-related future risks and hazards.

Risk estimates developed in this document for future vapor intrusion used measured soil gas concentrations modeled using a spreadsheet model to estimate future indoor air concentrations. Modeling is associated with some uncertainty, and inputs to the model were chosen to ensure that theoretical risks and hazards would be over- rather than underestimated. For example, to be conservative and health protective, loam was selected as the soil type for the Johnson and Ettinger model. However, the measured effective conductivity (K_s) for shallow soils at the site is significantly lower than the

default value (0.5 cm/hr) used for loam in the model. Measured effective conductivities for the site are shown in Table 7-1.

Ambient air concentrations in the excavation for the future construction worker were also estimated using measured soil gas concentrations. As noted above, modeling introduces additional uncertainties into the estimates. A comparison of modeled excavation ambient air to actual measured ambient air is provided in Table 7-2. As shown in the table, measured and modeled PCE and TCE concentrations are similar. However, measured and modeled concentrations for some chemicals like acetone and benzene are very dissimilar. This variance could indicate that other outdoor sources (such as benzene in car exhaust) contribute to ambient air concentrations at the site.

To estimate ambient air concentrations from soil gas concentrations, measured soil gas concentrations were back-calculated using a partitioning equation to estimate a soil source concentration. The DTSC indoor air guidance (CalEPA 2005) notes that soil to soil gas partitioning equations introduce a number of uncertainties into the results.

7.4 Uncertainties Associated with Toxicity Assessment

A potentially large source of uncertainty is inherent in the derivation of the EPA toxicity criteria (i.e., RfDs, and cancer slope factors). In many cases, data must be extrapolated from animals to sensitive humans by the application of uncertainty factors to an estimated NOAEL or LOAEL for non-cancer effects. While designed to be protective, it is likely in many cases that uncertainty factors overestimate the magnitude of differences that may exist between human and animals, and among humans.

In some cases, however, toxicity criteria may be based on studies that did not detect the most sensitive adverse effects. For example, many past studies have not measured possible toxic effects on the immune system. Moreover, some chemicals may cause subtle effects not easily recognized in animal studies. The effects of lead on cognitive function and behavior at very low levels of exposure serve as examples.

In addition, derivation of cancer slope factors often involves linear extrapolation of effects at high doses to potential effects at lower doses commonly seen in environmental exposure settings. Currently, it is not known whether linear extrapolation is appropriate. In all likelihood, the shape of the dose response curve for carcinogenesis varies with different chemicals and mechanisms of action. It is not possible at this time, however, to describe such differences in quantitative terms.

It is likely that the assumption of linearity is conservative and yields slope factors that are unlikely to lead to underestimation of risks. Yet, for specific chemicals, current methodology could cause slope factors, and, hence, risks, to be underestimated.

Use of CalEPA toxicity criteria could either over or underestimate potential risks, but it is difficult to determine either the direction or magnitude of any errors. In general,

however, it is likely that the criteria err on the side of protectiveness for most chemicals.

Benzo(g,h,i)perylene in soil was the only chemical eliminated based on lack of toxicity criteria. Quantitative risks and hazards could not be calculated for this chemical in the absence of toxicity criteria. As such, this chemical was removed from the quantitative analysis. Omission of this chemical is unlikely to affect the outcome of the risk assessment. Although toxicity factors have not been identified for this chemical, USEPA has classified benzo(g,h,i)perylene as not being a human carcinogen. Studies verifying non-carcinogenic effects from exposure to benzo(g,h,i)perylene are not available at this time.

In August 2001, EPA released a health risk assessment for TCE that presents a new cancer slope factor range, 2E-02 to 4E-01 $(mg/kg\text{-}day)^{-1}$, which would result in calculated risk estimates two to 40 times greater than those calculated with OEHHA's slope factor for TCE, 1.3E-02 $(mg/kg\text{-}day)^{-1}$. The revised cancer slope factor range was based on stronger epidemiological evidence than was available for previous assessments. In particular, several diverse studies including cancer estimates derived for kidney and liver cancer from occupational exposure, non-Hodgkin's lymphoma from exposure to drinking water and liver cancer in laboratory mice provide the basis for the quantitative assessment. Currently, under EPA's cancer guidelines TCE would be classified as a "probable human carcinogen" (group B1), with "limited" human evidence and "sufficient" animal evidence of carcinogenicity. Under EPA's proposed cancer guidelines, TCE can be characterized as "highly likely to produce cancer in humans".

EPA's online toxicity database, IRIS, currently does not list toxicity factors for TCE, instead indicating that the carcinogen assessment for this chemical has been withdrawn following further review. The OEHHA online toxicity database continues to list the oral slope factor of 1.3E-02 $(mg/kg\text{-}day)^{-1}$ and inhalation slope factor of 7.0E-03 $(mg/kg\text{-}day)^{-1}$ for TCE. These values were used for the evaluation of TCE exposure in this risk assessment.

As shown in the tables and figures in Section 6, PCE is the primary risk driver at the site, followed by TCE. If the new EPA TCE cancer slope factors were used, TCE risk values could be 2 to 40 times greater than calculated in this assessment and would make TCE the primary risk driver. Since the calculated risks already indicate unacceptable risks due to exposure to PCE, the revision of the TCE toxicity values would not change the overall outcome of the assessment. In addition, any mitigation measures designed to reduce inhalation exposure to PCE would reduce inhalation exposures to TCE as well.

As noted in Section 5, dermal absorption factors are not available for all COPCs. RAGS Part E guidance only provides factors for semi-volatile organics. Volatile organics are likely to vaporize when they come in to contact with the skin and exposure to these chemicals are better captured under the inhalation pathway. Dermal exposure to inorganics is highly dependent on the speciation of the

inorganics, and further research is not yet available. Thus, because dermal exposures cannot be further characterized at this time, dermal exposures in this risk assessment may underestimate actual risks and hazards.

7.5 Uncertainties in Risk Characterization

The current and future land use of the site was assumed to be commercial/industrial. The possibility that this site would be redeveloped for residential use is remote. Its location, surrounded by commercial/residential businesses and next to a major arterial, make it undesirable and unlikely for residential development. In addition, City representatives have stated that it is unlikely that the Omega property will be redeveloped for residential uses (Adams, 2007). Thus, the assumption of a commercial/industrial land use is reasonable and appropriate.

Also if the site were redeveloped, with the construction of new commercial/industrial facilities, the foundation of the new facilities would be new and would likely not have significant cracks (as assumed in the indoor vapor intrusion model) that would allow easy passage of soil vapors.

The risk assessment assumes that current concentrations of COPCs will remain constant into the future. Data are not available, however, to verify the appropriateness of this assumption. However, risk calculations for indoor air (which appears to be the primary pathway of concern) were based on data collected from 2004 to 2006. A review of the PCE indoor air data collected during this time period (provided in Table 7-3) shows a general decreasing trend of PCE concentrations. As such, it is likely that the risks calculated in this assessment provide an overestimate of future risks as PCE concentrations may decrease in the future. Uncertainties associated with future concentrations need to be taken into account whenever the risk estimates provided in this assessment are used in risk management decisions. They are considered equally important as the numerical estimates in providing a characterization of risk at the site.

Finally, risks and hazards calculated for exposures to construction workers to COPCs in surface and subsurface soil are artificially high. They are based on VOCs that will remain in surface soil only for short periods. Risks and hazards associated with direct contact with surface and subsurface soil appear to be minimal.

Table 7-1
Measured Soil Physical Properties

SAMPLE ID.	DATE	DEPTH feet	SAMPLE ORIENT. (1)	MOISTURE CONTENT (% wt)	OXIDATION REDUCTION POTENTIAL (mV)	CATION EXCHANGE (meq/100g)	TOTAL ORGANIC CARBON (mg/kg)	25.0 PSI CONFINING STRESS	
								NATIVE STATE EFFECTIVE PERMEABILITY TO WATER (2,3) (millidarcy)	NATIVE STATE EFFECTIVE HYDRAULIC CONDUCTIVITY (2,3) (cm/s)
		METHODOLOGY:		ASTM D2216	SM 2580B	EPA 9081	WALKLEY-BLACK	ASTM D5084	
GP1-015	12/29/03	15	v	25.6	230	8.7	2700	0.461	4.35E-07
GP1-035	12/29/03	35	v	6.1	250	2.6	790	103	9.38E-05
GP1-055	12/29/03	55	v	19.0	290	14.0	2450	0.051	4.72E-08
GP1-070	12/29/03	70	v	24.5	260	14.0	2700	0.125	1.15E-07
GP1-080	12/29/03	80	v	17.4	240	17.0	2100	0.031	2.87E-08
GP2-015	12/29/03	15	v	16.3	260	6.1	1850	0.326	3.01E-07
GP2-033	12/29/03	33	v	17.0	280	10.0	970	0.390	3.62E-07
GP2-045	12/29/03	45	v	19.6	300	13.0	1250	0.042	3.92E-08
GP2-060	12/29/03	60	v	18.8	320	14.0	1500	0.015	1.39E-08
GP2-085	12/29/03	85	v	19.8	300	13.0	1100	0.311	2.92E-07
GP3A-015	12/29/03	15	v	18.2	260	10.0	2450	0.838	7.89E-07
GP3A-030	12/29/03	30	v	22.6	310	18.0	2900	0.035	3.32E-08
GP3A-057	12/29/03	57	v	35.9	260	11.0	1450	0.227	2.14E-07
GP3A-070	12/29/03	70	v	23.3	300	13.0	1750	0.051	4.66E-08
GP3A-084	12/29/03	84	v	20.8	270	10.0	1400	0.206	1.90E-07
GP6-15	2/26/04	N/A	V	22.4	340	11	2550	0.943	8.96E-07
GP6-30	2/26/04	N/A	V	22.4	320	12	2000	0.868	8.27E-07
GP6-45	2/26/04	N/A	V	25.9	340	9	1750	0.756	7.22E-07
GP6-60	2/26/04	N/A	V	20.6	330	14	1400	0.599	5.73E-07
GP6-80	2/26/04	N/A	V	22.1	320	14	1950	0.575	5.48E-07
OC-SG-06-04-041204	5/11/04	N/A	V	12.0	NA	NA	NA	9.80	9.41E-06
OC-SG-06-08-041304	5/11/04	N/A	V	19.7	NA	NA	NA	0.829	8.04E-07
OC-SS-000-13-040604	5/11/04	N/A	V	19.8	NA	NA	NA	2.49	2.38E-06
OC-SS-000-20-040604	5/11/04	N/A	V	26.4	NA	NA	NA	0.268	2.62E-07

(1) Sample Orientation: H = horizontal; V = vertical

(2) Native State = As received with pore fluids in place

(3) Permeability to water and conductivity measured at saturated conditions

NA = not analyzed

mV = millivolts

mg/kg = milligrams per kilograms

cm/s = centimeters per secong

meq/100 g = milliequivalents per 100 grams of soil

Table 7-2
Comparison of Modeled Ambient Air in Excavation with Measured Ambient Air Concentrations

Chemical	Maximum Measured Ambient Air Concentration - All Parcels ug/m^3	Measured Soil Gas 5 to 6 feet bgs - All Parcels		
		Soil Gas Exposure Point Concentration ug/m^3	Modeled Ambient Air Value based on EPC (1) ug/m^3	Is measured concentration higher than modeled?
1,1,1-TRICHLOROETHANE	1.15E+00	3.53E+05	1.58E+01	NO
1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE	1.76E+00	1.61E+06	2.67E+01	NO
1,1,2,2-TETRACHLOROETHANE	3.92E-01	ND	ND	NO
1,1-DICHLOROETHANE	ND	3.84E+04	1.64E+00	NO
1,1-DICHLOROETHENE	6.35E-01	6.60E+05	3.42E+01	NO
1,2-DICHLORO-1,1,2-TRIFLUOROETHANE	ND	9.38E+04	ND	NO
1,2-DICHLOROETHANE	ND	2.25E+03	1.35E-01	NO
1,2-DICHLOROBENZENE	2.94E-01	ND	ND	NO
1,4-DICHLOROBENZENE	3.91E-01	ND	ND	NO
2,2,4-TRIMETHYLPENTANE	ND	5.60E+01	ND	NO
ACETALDEHYDE	ND	9.72E+01	6.94E-03	NO
ACETONE	3.81E+03	5.97E+03	4.27E-01	YES
BENZENE	1.08E+00	1.42E+03	7.19E-02	YES
CARBON DISULFIDE	ND	5.13E+03	3.07E-01	NO
CARBON TETRACHLORIDE	6.29E-01	2.33E+02	1.05E-02	YES
CHLOROFORM	ND	5.73E+03	3.43E-01	NO
CIS-1,2-DICHLOROETHENE	ND	1.80E+04	7.61E-01	NO
DICHLORODIFLUOROMETHANE	3.32E+00	2.48E+03	1.14E-01	YES
ETHYLBENZENE	9.55E-01	ND	ND	NO
METHYLENE CHLORIDE	2.08E+00	ND	ND	NO
M,P-XYLENES	3.12E+00	6.08E+02	2.45E-02	YES
O-XYLENE	1.19E+00	ND	ND	NO
TETRACHLOROETHENE	1.76E+00	1.23E+06	5.08E+01	NO
TOLUENE	1.58E+01	1.59E+03	7.95E-02	YES
TRANS-1,2-DICHLOROETHENE	ND	6.70E+03	2.73E-01	NO
TRICHLOROETHENE	1.07E+00	1.84E+05	8.39E+00	NO
TRICHLOROFLUOROMETHANE (FREON 11)	1.97E+00	4.85E+05	2.43E+01	NO
VINYL CHLORIDE	ND	ND	ND	NO

(1) Exposure point concentrations for soil gas were modeled using a box model calculations to determine ambient air concentrations.
(1) Exposure point concentrations for soil gas were partitioned to soil concentrations and then entered into the RBCA Toolkit model to d
ug/m^3: microgram per cubic meter.
ND = not detected
NC: Not calculated. Excavation air concentration could not be calculated because physical parameters for constituent were not availab

Table 7-3
Summary of PCE Indoor Air Data for 2004-2006
Omega Chemical Site - Whittier, California

SAMPLE ID	SAMPLE DATE	SAMPLE TYPE	TETRACHLOROETHENE (ppbv)
OC-AA-FS-02-051104	5/11/2004	ORIG	145
OC-AA-FS-01-051104	5/11/2004	ORIG	140
OC1-LC1-G-0-11	5/11/2004	EPA	130
OC-AA-FS-05-051104	5/11/2004	ORIG	15
OC-AA-FS-06-051104	5/11/2004	ORIG	14
OC-AA-FS-07-051104	5/11/2004	ORIG	2.35
OC-AA-FS-11-051104	5/11/2004	ORIG	0.89
OC-AA-FS-09-051104	5/11/2004	ORIG	0.87
OC-AA-FS-10-051104	5/11/2004	ORIG	0.62
OC-AA-FS-13-051104	5/11/2004	ORIG	0.46
OC-AA-FS-14-051104	5/11/2004	ORIG	0.15
OC1-RC1-G-0-14	7/30/2004	EPA	24
OC1-CSR-G-0-15	7/30/2004	EPA	21.85
OC1-CSR-G-0-18	7/31/2004	EPA	85
OC1-RC1-G-0-20	7/31/2004	EPA	80
OC-IA-FS-20-080404	8/4/2004	ORIG	110
OC-IA-FS-16-080404	8/4/2004	ORIG	45
OC-IA-FS-18-080404	8/4/2004	ORIG	40
OC-IA-FS-21-080404	8/4/2004	ORIG	26
OC-IA-FS-22-080404	8/4/2004	ORIG	24
OC-IA-FS-23-080404	8/4/2004	ORIG	23
OC-IA-FS-19-080404	8/4/2004	ORIG	1.4
OC1-CSR-G-0-34	12/29/2004	EPA	14
OC1-RC1-G-0-32	12/29/2004	EPA	13
OC1-OFF-G-0-33	12/29/2004	EPA	4.3
OC-IA-FS-03-122904	12/30/2004	ORIG	12
OC-IA-FS-04-122904	12/30/2004	ORIG	12
OC-IA-FS-01-122904	12/30/2004	ORIG	11
OC-IA-FS-02-122904	12/30/2004	ORIG	9.6
OCI-OFF-G-0-38	1/12/2005	EPA	ND
OCI-CSR-G-0-36	1/12/2005	EPA	13
OC-IA-FS-04-011205	1/12/2005	ORIG	8.3
OC-IA-FS-03-011205	1/12/2005	ORIG	6.4
OC-IA-FS-02-011205	1/12/2005	ORIG	6.3
OC-IA-FS-01-011205	1/12/2005	ORIG	5.2
OCI-RCI-G-0-37	1/12/2005	EPA	5.1
OC-AA-FS-02-091405	9/14/2005	ORIG	12.5
OC-AA-FS-17-091405	9/14/2005	ORIG	12
OC-AA-FS-18-091405	9/14/2005	ORIG	10
OC-AA-FS-16-091405	9/14/2005	ORIG	8.7
OC-IA-FD-06-091405	9/14/2005	ORIG	6.6
OC-IA-FD-05-091405	9/14/2005	ORIG	5.7
OC-IA-FS-07-091405	9/14/2005	ORIG	5
OC-AA-FS-10-091405	9/14/2005	ORIG	3.3
OC-IA-FS-14-091405	9/14/2005	ORIG	1.9
OC-IA-FS-13-091405	9/14/2005	ORIG	1.1
OC-AA-FS-11-091405	9/14/2005	ORIG	0.69
OC-IA-FD-09-091405	9/14/2005	ORIG	ND
OC-IA-LAC-Sm Prod-090806	9/8/2006	ORIG	ND
OC-IA-BIS-STORE-090806	9/8/2006	ORIG	4.3
OC-IA-BIS-AO-090806	9/8/2006	ORIG	1.5
OC-IA-BIS-WHSE-090806	9/8/2006	ORIG	1
OC-IA-LAC-Lg Prod-090806	9/8/2006	ORIG	0.24
OC-IA-ONC-NS-090806	9/8/2006	ORIG	0.065
OC-IA-LAC-AO-090806	9/8/2006	ORIG	0.036
OC-IA-MN-090806	9/8/2006	ORIG	ND
OC-IA-ONC-AO-090806	9/8/2006	ORIG	ND

ppbv - parts per billion by volume

Section 8
Summary and Conclusions

The primary findings and conclusions of this risk assessment are briefly summarized in this section. The following tasks were performed as part of this risk assessment:

- Examined the history of the Omega Chemical site in Whittier, CA, and identified types of chemicals used and likely release mechanisms for these chemicals to enter the environment
- Evaluated data collected to characterize the site and existing contamination and used the most recent of these data to select chemicals of potential concern (COPCs) and to calculate exposure point concentrations
- Analyzed the potential for exposure to COPCs at the site though an evaluation of people that might be exposed, exposure pathways that might result in significant contact between these people and COPCs, and identification of exposure parameters appropriate for quantifying exposure resulting from this contact.
- Identified appropriate toxicity criteria for site COPCs
- Estimated risk to current and potential future receptors (people) that might contact contamination
- Evaluated uncertainties in data, exposure, toxicity and risk characterization aspects of the risk assessment
- Calculated health-based remediation goals (HBRGs) for use in remediation decisions for the site

Important results of the risk assessment that follow from the above assessments can be summarized as follows:

- Field investigations since 2004 provide a recent and complete site characterization. High confidence can be assigned to use of these data to select chemicals of potential concern and to estimate exposure point concentrations.
- Commercial/industrial land use is an appropriate assumption for future site use. The site has been used for such purpose since it was developed from agricultural land in the 1950's. The site is still surrounded by commercial industrial land use, is located on a major arterial, and possesses no characteristics that would suggest that would make it desirable for residential development. In addition, City representatives have stated that it is unlikely that the Omega property will be redeveloped for residential uses (Adams, 2007).

- Among receptors likely to be exposed to site-related contaminants, the highest cancer risks and noncancer hazards are associated with exposure of hypothetical future residents, with risks above the EPA risk range and hazards above the target threshold.

- The pathway that suggests the highest potential for exposure involves intrusion of vapors into indoor air spaces. Inhalation of these vapors indoors results in the highest estimates of potential cancer risk and noncancer hazard.

- No complete exposure pathways exist that involves contact with contaminants in soils and groundwater below the 30-foot clay zone.

- PCE is the primary COPC of concern at the site. For example, inhalation of indoor air suggests potential total inhalation cancer risks for current industrial workers ranging from 8E-6 to 7E-5. Cancer risk associated with inhalation exposure to PCE alone ranges from 5E-7 to 4E-05. Estimated hazards for PCE were relatively low, however. HQs for exposure to indoor air for PCE ranged from 0.01 to 1.6 compared to a total inhalation HIs ranging from 0.05 to 8.

- Potential risks associated with exposure to ambient (urban background) concentrations of VOCs are as high as $3x10^{-5}$ and may account for 12 to essentially 100 percent of total risks estimated for indoor exposures, depending on parcel. LA Carts/Oncology Care may not be affected by site-related VOCs. Incremental risks that could be associated with vapor intrusion are significantly less than those presented for total risks at the site.

- Ambient air risks for construction workers are within the EPA risk range, while ambient air hazards are above the target threshold primarily attributable to inhalation of PCE in ambient air. These risks are likely to be overestimated given the amount of dilution anticipated for VOCs release to ambient air.

- Hypothetical exposure to contaminants in soil is unlikely to occur, since soil is currently covered with buildings, asphalt, and concrete and such cover is likely to remain even if the site is redeveloped for other commercial/industrial purposes in the future. Further, volatile COPCs, in particular PCE, acetone, and toluene, will not persist in non-volatile form in soils exposed during excavation, and direct contact exposures (incidental ingestion and dermal contact) for construction worker exposures via these pathways are expected to be minimal. These VOCs along with benzo(a)pyrene were associated with the bulk of risks and hazards estimated for direct contact exposure to surface soils.

- Uncertainties in the risk assessment suggest that site-related risks have been adequately characterized to support risk management decisions. In fact, the database is biased toward source/release areas and likely overstates levels of contamination for the site as a whole.

- Site-related risks involving exposure to PCE vapors in indoor air appear to be adequately assessed using available site-specific data.

- HBRGs developed for PCE can be used upon approval by EPA with confidence in evaluating remedial alternatives, if the site is deemed to pose an unacceptable risk.

Section 9
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Appendix A
Risk Calculations

A-1 UCL Summaries

A-2A USEPA Adult Lead Model

A-2B Leadspread Model

A-3 RAGS D Tables

A-4 Johnson and Ettinger Model Calculations

A-5 HBRG Calculations

A-6 Ambient Air from Soil Gas Calculations

A-7 RBCA Printouts for Ambient Air for Construction Scenario

Appendix B
Arsenic Statistical Evaluation

Appendix C
City of Whittier Reference – Adams, 2007